

Group J

Group H Map

Building 4023

Includes Building 4742, Substation

Building 4024

Includes Building 4928, Cooling Tower

Includes Building 4725, Substation

Building 4025

Includes Building 4924, Substation

Includes Building 4925, Mechanical Equipment Slab

Includes Building 4926, Sodium Reactor Experiment (SRE) Mock-up Equipment Area

Includes Building 4725, Substation for 4024 and 4025

Building 4027

Includes Building 4727, Substation

Building 4032

Includes Building 4727, Substation

Building 4036/4037

Includes Building 4727, Substation

Building 4042

Includes Building 4742, Substation

Site 4524

Site 4536

Includes Building 4836, Time Clock

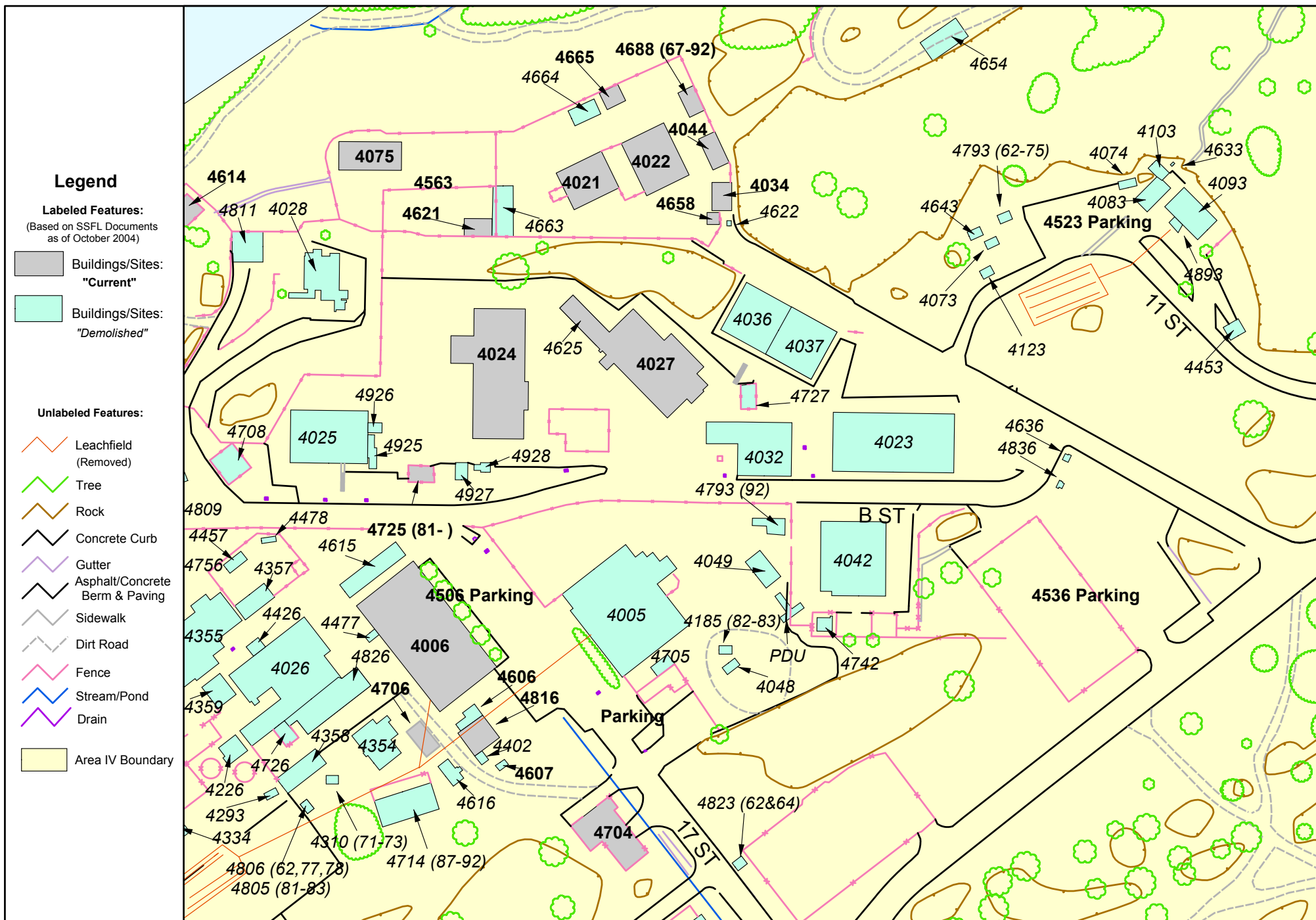
Includes Building 4636, Guard Shack

Site 4537

Building 4625

Building 4927

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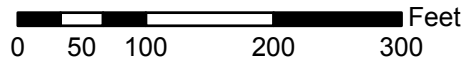
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CONSULTING INC

DATE:

May 2005



1 inch equals 150 feet



Site Summary Group J

AREA IV

Santa Susana Field Laboratory, CA

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Site Summary – Building 4023

Site Identification:

Building 4023
Liquid Metals Component Test Building
Corrosion Test Loop
Includes Building 4742, Substation

Operational Use/History:

- The first section of Building 4023, constructed in 1962 (known as 023), housed a small sodium loop to conduct studies of radioactive contamination transport. The second section, constructed in 1976 (known as 23A), served as a storage and setup room as well as an analytical chemistry laboratory.¹
- In 1982, an Alnor Dew-Point Meter containing a 6.25 μCi Ra-226 source was brought to the facility to be disassembled, but the disassembly was never authorized or attempted and the instrument was removed intact in 1986.²
- A 10 μCi Mn-54 sealed source, which was checked annually to ensure that no leaks had occurred, was stored in the building from 1983 to 1986.²
- Sodium loop tests stopped in 1982 and the loop was dismantled and removed in 1986. At this point the connections to the tank were sealed and sinks were removed.¹
- In 1990 the high-efficiency particulate air (HEPA) filtration system and fume hoods were removed.²
- The remainder of the radioactive liquid waste system (pipes, drains, tank) was removed in 1993.²

Site Description:

- Building 4023 was a single story structure with galvanized steel walls and roof and a concrete slab floor. The sodium test loop was located in the western, or “old,” portion of the building. The “new” building section held an analytical chemistry laboratory and a storage set-up room.³
- The facility was approximately 20 feet below the general grade of the adjacent 12th Street.¹
- The waste holdup tank was located in an exterior sub-grade open-top concrete vault (7.5 feet x 10 feet x 6 feet) at the east end of Building 4023.²
- Serviced by Substation 4742.

Relevant Site Information:

- The majority of the contamination of Building 4023 was associated with drain lines and associated vent pipes, the holdup tank, the open top holdup tank pit, and a laboratory fume hood.⁴

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- The contaminants of concern associated with the activities at Building 4023 include: Co-60, Mn-54, Ni-63, Fe-55, Ta-182 and tritium. Limited amounts of Cs-137 and Sr-90 were also found.⁵
- Use Authorization 105 was issued in 1976. It allowed the use of a small section of activated stainless steel Experimental Boilers Reactor fuel cladding in a small sodium test loop to gather data on transport characteristics of radiological contamination in sodium loops.¹
- There have been two incidents associated with Building 4023 that could have resulted in a release to the environment:²
 - On December 18, 1980, water reacted with non-neutralized sodium and surged out of the loop. The water leak resulted in contamination of the ceiling, walls and floor with maximum contamination levels of 1,000 dpm/100 cm² of Mn-54 (A0084).
 - On April 28, 1981, there was a minor sodium leak and fire, with Cs-137, Mn-54 and Co-60 as the principal radioactive isotopes contained in the loop at the time. The fire was extinguished with calcium carbonate. Smears of the loop and the floor showed no radioactive contamination (A0257).
- All drain lines in Building 4023 were connected to the waste holdup tank system. The lines were both above and below ground.²

Radiological Surveys:

- In 1993, Rockwell/Rocketdyne conducted a final radiological survey to ensure compliance with acceptable contamination limits for activation products and mixed fission products and for ambient exposure rate.⁶
 - The scope of the survey included only the interior rooms of the building.
 - Contamination limit criteria are as follows:
 - For alpha and beta contamination:
 - Average contamination of $\leq 5,000$ dpm/100 cm².
 - Maximum of contamination $\leq 15,000$ dpm/100 cm².
 - Removable contamination of $\leq 1,000$ dpm/100 cm².
 - For gamma contamination:
 - ≤ 5 μ R/hr above background at 1 meter interior and exterior.
 - Initial surface scans indicated an area within Building 4023 with elevated levels of Cs-137 requiring additional decontamination.
 - These locations were decontaminated and post-remedial action scans found surface activity to be below release limits.
 - Observed detection limit ranges are as follows:
 - Removable alpha: 2 dpm/100 cm² to 9 dpm/100 cm².
 - Total beta: 252 dpm/100 cm² to 373 dpm/100 cm².
 - Removable beta: 6 dpm/100 cm² to 23 dpm/cm².
 - Net ambient gamma exposure rate: 0.49 μ R/hr to 0.66 μ R/hr.

- In 1994, ORISE conducted a verification survey using surface scans to confirm that remedial actions have been effective in meeting established guidelines. No soil samples were taken, because the entire area around Building 4023 was paved.³
 - Scans inside the Building 4023 Control Room identified elevated direct radiation in two areas that required additional investigation.
 - Rocketdyne personnel decontaminated the two areas and Environmental Survey and Site Assessment Program (ESSAP) personnel performed additional scans after the decontamination. Scans showed the beta surface activity was comparable to background levels.
 - Final survey results for total surface activity levels inside Building 4023 were less than 66 to 400 dpm/100 cm² for alpha and less than 1,400 to 6,700 dpm/100 cm² for beta.
 - Final survey results for activity levels on exterior surfaces, including the holdup waste tank vault, were less than 66 dpm/100 cm² to 120 dpm/100 cm² for alpha and less than 1,500 dpm/100 cm² to 1,600 dpm/cm² for beta.
- On August 28, 1997, the Radiological Health Branch (RHB) and the California Department of Health Services (DHS) conducted a confirmatory survey of Building 4023. A complete qualitative gamma scan of the facility and surrounding area was performed. Selected measurements of total and removable beta surface activity and local gamma exposure rates were also conducted.⁷
 - The survey results and laboratory analysis results confirmed the results of the final radiological survey in 1993 and the Oak Ridge Institute for Science and Education (ORISE) verification survey in 1994.⁸

Status:

- DOE formally released Building 4023 on April 21, 1997.⁹
- DHS concurred with release of Building 4023 on February 19, 1998.⁸
- Building 4023 was demolished in October 1999.

References:

- 1- DOE Document, Docket No. DOE/CD-ETEC-023, "Certification Docket for the Release of Building 023 at ETEC," February 1997.
- 2- Rocketdyne Report, 023-AR-0002 Rev. A., "Building 023 D&D Operations Final Report," March 7, 1996.
- 3- ORISE Report, 94/K-14, "Verification Survey of Buildings 005, 023, and 064, Santa Susana Field Laboratory, Rockwell International, Ventura County, California," October 1994.
- 4- Rocketdyne, Internal Letter, "Assessment Plan for Building 023 D&D, from P. Waite to R. Meyer", January 12, 1993.
- 5- Rocketdyne, Internal Letter, "Potential Contaminants at T023," from R. J. Tuttle to P. Rutherford, January 20, 1993.
- 6- Rocketdyne Report, 023-ZR-0001, "Final Radiological Survey Report of Building 023," March 1, 1994.

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- 7- Rocketdyne, E-mail, "State DHS/RHB Inspection of T023," from R. Tuttle to P. Rutherford, et al, August 29, 1997.
- 8- DHS/RHB, Letter, "Boeing's Request for Concurrence in Release for Use Without Radiological Restriction, Rocketdyne Santa Susana Field Laboratory Building T023," from Gerard Wong (DHS/RHB) to Phil Rutherford, February 19, 1998.
- 9- DOE/OAK, Letter, "Release of Facilities for Unrestricted Non-Radiological Use," from Roger Liddle (DOE/OAK) to Mark Gabler, April 21, 1997.
- 10- Historical Site Photographs from Boeing Database.
- 11- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4023



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Site Summary – Building 4024

Site Identification:

Building 4024
Development Test Laboratory
Systems for Nuclear Auxiliary Power (SNAP) Environmental Test Facility (SETF)
Includes Building 4928, Cooling Tower
Includes Building 4725, Substation

Operational Use/History:

- Constructed in 1960.
- Building 4024 was used for testing SNAP reactors in a simulated operational environment. It was enlarged in 1962 to provide a second control room and increased operating equipment area.¹
- Prototype reactor SNAP 2 Demonstration Reactor (S2DR) operated for 5,000 hours at 30 and 50 kWt in the east cell between April 1961 and December 1962.¹
- Prototype SNAP 10 Flight System (S10FS-3) reactor operated for 10,000 hours at about 40 kWt in the west cell between January 1965 and March 1966.¹
- SNAP Critical Assembly 4B, operated in the east cell for a short time at low power.¹
- SNAP Transient Test (SNAPTRAN-1) support reactor, also critical, operated in the east cell for a short time. Typically SNAPTRAN-1 was operated at low power, except for some pulsed operation. This reactor last operated in 1971. It was the last reactor to be tested in Building 4024.¹

Site Description:

- Building 4024 consists of two levels, one at ground level and a sub-grade basement.²
 - The areas within (and associated with) Building 4024 included: a high bay, including cell complex and operating gallery, a general support and operating area, a mechanical/electrical support area, and a yard.
- Building 4024 is constructed of aluminum siding, steel framing, some flooring and concrete.²
- The basement consists of a cell complex with two power test cells and a cell-transfer lock. This complex is constructed of shielded concrete walls ranging from two feet to nine feet thick, penetrated by various through-tubes, conduits and cooling pipes.¹
- Below-ground radioactive waste storage facilities are located under asphalt in the yard.¹ The buried tanks include:
 - Three radioactive gas holdup tanks 6 feet in diameter and 40 feet long.
 - Eight solid radioactive waste storage vaults 3 feet in diameter and 4 feet deep.

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- Two 500-gallon liquid radioactive waste holdup tanks.
 - The tanks were placed on top of a concrete box filled with gravel designed to contain any accidental leakage.
- All non-radioactive sewage wastes are collected by a sanitary sewer system.¹
- All wash-down water and emergency releases from the cooling systems are routed to the underground liquid waste holdup tanks via floor sinks and buried drain lines.¹
- Serviced by Substation 4725.
- Serviced by Cooling Tower 4928.

Relevant Site Information:

- Potential radiological hazards are limited to the high bay area (including cell complex), electrical/mechanical support and yard areas.¹
 - Two general areas of concern in the high bay are the cells and the S10FS-3 reactor support equipment room.
 - The electrical/mechanical support area contains systems for gas and exhaust filtering, shield cooling water and a vacuum cleaner, all of which are potentially contaminated.
- As a result of exposure to neutrons escaping from the two operating reactors, the walls, ceiling, floor and remote handling equipment of the test cells were activated.¹
- There have been several incidents associated with Building 4024 that could have resulted in a release to the environment.
 - On March 6, 1962, a welder was burned with NaK in the high bay (A0535).
 - On February 19, 1970, maintenance workers unknowingly worked on contaminated general mills (A0634).

Radiological Surveys:

- In September 1978, prior to partial unrestricted release, surveys were conducted to ensure that the facility met unrestricted release criteria.³
 - No contamination in excess of 50 dpm/100 cm² was found.
 - No alpha activity was detected anywhere in Building 4024.
 - Beta-gamma surface contamination limits were 0.1 mrad/hr, and the maximum beta-gamma surface contamination detected outside of the power vaults was 0.07 mrad/hr with an average background of 0.05 mrad/hr.
 - Inside the power vaults, beta-gamma surface contamination was found to range from 0.5 mrad/hr to 2.5 mrad/hr.
 - Inside the corridor to the power vaults, beta-gamma surface contamination ranged from 0.02 mrad/hr to 1.8 mrad/hr.
 - Soil samples were collected in the yard and all samples were less than 30 pCi/g. Background is 20-30 pCi/g.
 - Concrete cores drilled in the power vault walls and corridor were found to have a maximum specific activity of 818 pCi/g. The average specific activity was 103 pCi/g.

- All water samples from the drain pipe in the operating gallery, the hot waste storage vault, cooling system water waste holdup tanks, ground water during the removal of waste tanks and the vacuum cleaning line to the west power vault were below 2.2×10^{-7} $\mu\text{Ci/ml}$, which is below the limit of 3×10^{-7} $\mu\text{Ci/ml}$ for Sr-90.
- On March 26, 1981, additional concrete sampling in the power vaults began to determine the amount of concrete they needed to remove to meet unrestricted release criteria.¹
 - The survey indicated that 12 to 22 inches of concrete would need to be removed for surface radiation to meet the acceptable dose rate of 0.1 mrad/hr.
 - Only two radionuclides, Co-60 and Eu-152, were found to contribute significantly to radiation greater than background.
- In September 1995, ORISE Conducted an independent verification survey.²
 - Surface scans were performed over 50 to 100% of accessible floors and lower walls (up to 2 meters) for alpha, beta and gamma activity.
 - In the fan room, elevated direct beta radiation was identified.
 - In all other areas, alpha, beta and gamma radiation were within the range of ambient site background.
 - Surface activity measurements were conducted at 76 floor and wall locations.
 - Excluding the power vaults, surface activity levels were less than 55 dpm/100 cm² for alpha and ranged from less than 1,400 to 33,000 dpm/100 cm² for beta.
 - Removable alpha: less than 12 dpm/100 cm².
 - Removable beta: less than 16 dpm/100 cm².
 - Maximum beta-gamma total surface activity guideline (15,000 dpm/100 cm²) was exceeded in the hot gas compression room of Building 4024.
 - Exposure rate measurements were made at four locations in Building 4024, but none were made in the power vaults.
 - Excluding the power vaults, exposure rates ranged from 11 to 13 $\mu\text{R/hr}$. Background was 8 $\mu\text{R/hr}$.
 - Interior exposure rates satisfy Department of Energy (DOE) and Nuclear Regulatory Commission (NRC) exposure rate guidelines.
 - ORISE determined that existing documentation for Building 4024 was inadequate to support the determination that DOE guidelines for unrestricted release were met.
- Additional concrete core data taken in 2003 indicates activation with a maximum of 9.3 pCi/g of Co-60 and a maximum of 105 pCi/g of Eu-152. Measurable activation exists only within the inner 16 inches of concrete of the two power test cells.⁴

Status:

- Decontamination and disposition (D&D) of Building 4024 began on August 27, 1977, and concluded sometime before September 1, 1978.³

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- Within the vaults, all components such as rails, fixtures, surface mounted conduits and all wires in through-tubes were removed between August 1977 and September 1978.
- The vacuum system, piping and tanks, and concrete seal door with an 18-inch diameter gas exhaust pipe were removed.
- The liquid and gas waste holdup tanks and associated piping were removed.
- All contaminated or activated components throughout the facility were packaged for offsite burial or decontaminated to meet applicable limits.
- All areas of Building 4024 except the two power test vaults were determined by survey to be suitable for release for unrestricted use.³
- The power test vaults are restricted and have remained in surveillance and maintenance mode since September 1, 1978.²
- Additional decontamination of Building 4024 is planned for FY 2004.

References:

- 1- Atomics International Document, N704FDP990006 Rev. A., "Building T024 (SETF) Facilities Dismantling Plan," July 31, 1981.
- 2- ORISE Report, 96/C-5, "Verification Survey of Buildings T019 and T024, Santa Susana Field Laboratory, Rockwell International, Ventura County, California," February 1996.
- 3- Rockwell International Document, N704TI990044, "Radiological Survey Results—Release to Unrestricted Use, Building 024, SSFL," November 28, 1978.
- 4- Personnel Interview, Phil Rutherford, September 18, 2003.
- 5- Historical Site Photographs from Boeing Database.
- 6- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4024



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Site Summary – Building 4025

Site Identification:

Building 4025
Sodium Component Test Installation (SCTI) Maintenance and Storage
Remote Handling Mock-up Facility
Includes Building 4924, Substation
Includes Building 4925, Mechanical Equipment Slab
Includes Building 4926, Sodium Reactor Experiment (SRE) Mock-up Equipment Area
Includes Building 4725, Substation for 4024 and 4025

Operational Use/History:

- Constructed in 1959.
- Building 4025 was used for nuclear reactor remote handling and viewing mock-up work in support of the SNAP 2/10A and SNAP 8 tests.¹
- Building 4025 was not known to contain radioactive or nuclear materials.
- After support work for SNAP tests ceased, Building 4025 was used as a storage and warehouse facility.¹
- Demolished in September 1999.

Site Description:

- Building 4025 had a steel frame with steel sides and a steel roof and consisted of three bays. The low bay had a ceiling height of 9 feet, the middle bay had a ceiling height of 20 feet and the high bay had a ceiling height of 35.5 feet.¹
- On a 1962 Industrial Planning Map, Building 4925 Mechanical Equipment Slab and Building 4926 SRE Mock-up Equipment Area were identified as separate from but adjacent to Building 4025. In subsequent Industrial Planning Map, the outlines of Buildings 4925 and 4926 remain, but no longer have their own numbers. As such, it is assumed that both 4925 and 4926 are included in Building 4025, and that all three were treated as a single facility.^{1,2}
- Serviced by Substations 4725 and 4924.¹

Relevant Site Information:

- Building 4025 was located in close proximity to Radioactive Materials Handling Facility (RMHF), and direct radiation and skyshine from RMHF affected ambient radiation conditions in the area.¹
- An incident occurred on January 16, 1979, in which a radiograph operator's dosimeter read off-scale during radiograph operation, indicating a potential personnel exposure. The radiograph operator's assistant was present at the time, and his dosimeter gave a normal reading. After processing of the off-scale dosimeter, it

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was determined that the operator had not been exposed to an unacceptable dose. No cause for the off-scale reading was determined (A0306).

Radiological Surveys:

- As part of the Department of Energy (DOE) Santa Susana Field Laboratory (SSFL) Site Survey, Building 4025 was surveyed to determine if any residual activity was accidentally left behind as a result of operations in support of the SNAP program. The inside and outside portions of Building 4025 were surveyed as separate units.¹
 - Inside:
 - Maximum net gamma: 3.6 $\mu\text{R/hr}$ (corrected for background and statistically tested against an acceptance limit of 5 $\mu\text{R/hr}$).
 - Average net gamma: -0.43 $\mu\text{R/hr}$ (corrected for background).
 - Based on the median value of exposure rate measurements in the vicinity of 4025, the inside ambient background value for gross gamma was determined to be 11.8 $\mu\text{R/hr}$.
 - All beta surface activity measurements made “for indication” showed no detectable activity.
 - Based on the results of the interior survey of Building 4025, the conclusion was made that this area passed the criteria for unrestricted use.
 - Outside:
 - Maximum net gamma: 3.9 $\mu\text{R/hr}$ (corrected for background and statistically tested against an acceptance limit of 5 $\mu\text{R/hr}$).
 - Average net gamma: -0.14 $\mu\text{R/hr}$.
 - Based on the median value of exposure rate measurements in the vicinity of 4025, the outside ambient background value for gross gamma was determined to be 24.0 $\mu\text{R/hr}$.
 - Based on the results of the exterior survey of Building 4025 and the storage yard, the conclusion was made that this area was not contaminated and passed the criteria for unrestricted use.

Status:

- Building 4025 was demolished in September 1999.

References:

- 1- ETEC Document, GEN-ZR-0013, “Radiological Survey of Buildings T049, T042, T027, T032, and T025,” August 26, 1988.
- 2- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 3- Historical Site Photographs from Boeing Database.

Photograph – Building 4025



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Site Summary – Building 4027

Site Identification:

Building 4027
SNAP Engineering Development Laboratory 2
Former Weld Shop
SNAP Vibration and Shock Laboratory
Includes Building 4727, Substation

Operational Use/History:

- Constructed in 1961.
- Building 4027 was used as a vibration and shock test facility in support of the SNAP program launch schedule.¹
- Following the end of support work for SNAP tests, Building 4027 was used as a non-radiological storage facility.
- Building 4027 was demolished in 2003.

Site Description:

- Building 4027 is a 9,240-square-foot structure located south of RMHF.² The building has a steel frame, steel sides and a steel roof. It consists of a 37-foot high bay laboratory area, an office and shop support/storage.¹
- Serviced by Substation 4727.

Relevant Site Information:

- There are no Use Authorizations associated with Building 4027.³
- No incidents occurred in Building 4027 that might have resulted in a release of contamination to the environment.³
- Building 4027 may have been used for storing sealed radiography sources, which would have been checked annually to ensure that no leaks had occurred.

Radiological Surveys:

- As part of the DOE SSFL Site Survey, Building 4027 was surveyed to determine if any residual activity was accidentally left behind as a result of operations in support of the SNAP program. The high bay and storage portions of Building 4027 were surveyed as separate units due to variations in “ambient background.”¹
 - High Bay
 - Maximum net gamma: 3.8 $\mu\text{R/hr}$ (corrected for background and statistically tested against an acceptance limit of 5 $\mu\text{R/hr}$).
 - Average net gamma: 0.46 $\mu\text{R/hr}$.

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- Based on the median value of exposure rate measurements in the vicinity of Building 4027, the ambient background value for gross gamma was determined to be 9.09 $\mu\text{R/hr}$.
- All beta surface activity measurements made “for indication” showed no detectable activity.
- Based on the results of the interior survey of Building 4027, the conclusion was made that this area passes the criteria for unrestricted use.
- Storage
 - Maximum net gamma: 2.8 $\mu\text{R/hr}$ (corrected for background and statistically tested against an acceptance limit of 5 $\mu\text{R/hr}$).
 - Average net gamma: -1.26 $\mu\text{R/hr}$.
 - Based on the median value of exposure rate measurements in the vicinity of Building 4027, the ambient background value for gross gamma was determined to be 17.40 $\mu\text{R/hr}$.
 - All beta surface activity measurements made “for indication” showed no detectable activity.
 - Based on the results of the exterior survey of Building 4027 and the storage yard, the conclusion was made that this area is not contaminated and passes the criteria for unrestricted use.

Status:

- Building 4027 was demolished in 2003.

References:

- 1- ETEC Document, GEN-ZR-0013, “Radiological Survey of Buildings T049, T042, T027, T032, and T025,” August 26, 1988.
- 2- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 3- Review of Radiation Safety Records Management System, 2003.

Site Summary – Building 4032

Site Identification:

Building 4032
Liquid Metal Development Lab (LMDL)
Space Environmental Test Facility
Includes Building 4727, Substation

Operational Use/History:

- Constructed in 1962.
- Building 4032 was used as a space environmental test facility for a thermal vacuum system.¹
- Building 4032 was used for mock-ups using a radiological source to determine the positioning of non-radioactive rods for use in developing the fuel rod control system.¹
- After support work for SNAP tests ceased, Building 4032 was used as a sodium component and instrumentation test facility.
- Demolished in May 2003.

Site Description:

- Building 4032 was 4,580 square feet with 32-foot ceilings. The structure had a steel frame, steel sides and a steel roof. It contained 4,200 square feet of laboratory space.¹
- Serviced by Substation 4727.

Relevant Site Information:

- From 1978 through 1983, Building 4032 was used for mock-ups using a radiological source to determine the positioning of non-radioactive rods for use in developing the fuel rod control system. During these experiments, under Use Authorization 118, a radiation source was used to determine the location, free fall time and acceleration of the articulated rod assembly of the Self Actuated Shutdown System-Articulated Control Assembly (SASS-ACA) test article. The source was 97.2 μCi of Co-60. The form was sealed source S/N 43014, which was checked annually to ensure no leakage occurred.²

Radiological Surveys:

- During the 1988 beta survey, a stainless steel catch pan was found to be slightly contaminated with Co-60 at a level of about 25,000 dpm/100 cm². The catchpan was most likely from Building 4059 or related to the SNAP facility and ended up in Building 4032 accidentally. The radioactivity was fixed in the steel and did not spread to surrounding areas. The pan was dispositioned as radioactive waste.¹

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- As part of the DOE SSFL Site Survey, Building 4032 was surveyed to determine if any residual activity was accidentally left behind as a result of operations in support of the SNAP program.¹
 - The maximum gamma exposure rate (corrected for background and statistically tested against an acceptance limit of 5 $\mu\text{R/hr}$) in Building 4032 was 4.4 $\mu\text{R/hr}$. The average value was 0.43 $\mu\text{R/hr}$.
 - Based on the median value of exposure rate measurements in the vicinity of Building 4032, the ambient background value for gamma was determined to be 7.27 $\mu\text{R/hr}$.
 - All beta surface activity measurements made “for indication” showed no detectable activity, except for the stainless steel catch pan described above.
- Based on the results of the survey of Building 4032, the conclusion was made that this area passes the criteria for unrestricted use.¹

Status:

- Building 4032 was demolished in May 2003.

References:

- 1- ETEC Document, GEN-ZR-0013, “Radiological Survey of Buildings T049, T042, T027, T032, and T025,” August 26, 1988.
- 2- Authorization Series 118, Shutdown Rod Measurement, J. V. Menteer, August 1978.
- 3- Historical Site Photographs from Boeing Database.
- 4- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4032



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Site Summary – Building 4036/4037

Site Identification:

Building 4036/4037
SNAP Office Buildings
Includes Building 4727, Substation

Operational Use/History:

- Constructed in approximately 1962.
- Building 4037 appears distinctly only on the 1962 map. Thereafter, it is labeled as part of Building 4036.¹
- Building 4036/4037 operated as a non-nuclear office building for the SNAP program.
- Demolished in 1999.

Site Description:

- Building 4036/4037 consisted of two one-story metal buildings joined together, each with a concrete slab floor and concrete foundation. The support structure consisted of steel beams with corrugated steel siding and roof. The buildings contain numerous internal partition walls with wood framing and drywall surfaces.²
- Serviced by Substation 4727.

Relevant Site Information:

- There are no Use Authorizations and no Incident Reports associated with Building 4036.³
- Building 4036 did not require radiological controls during demolition.²

Radiological Surveys:

- Radiological surveys specific to Building 4036 have not been conducted.

Status:

- Building 4036 was demolished in 1999.

References:

- 1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 2- Boeing Document, EID-04366, "Removal of DOE Buildings, Demo Pak A," May 18, 1999.
- 3- Review of Radiation Safety Records Management System, 2003.
- 4- Historical Site Photographs from Boeing Database.

Photograph – Building 4036/4037



Site Summary – Building 4042

Site Identification:

Building 4042
Liquid Metal Fast Breeder Reactor (LMFBR) Development Testing
SNAP Shield Casting Facility
Includes Building 4742, Substation

Operational Use/History:

- Constructed in 1963.
- Building 4042 was used as a general test and lithium hybrid shield fabrication building in support of the SNAP program. The facility was also used for sodium-aerosol and related technology tests.¹
- After support work for SNAP tests ceased, Building 4042 was used for liquid metal technology work.
- Demolished in May 2003.

Site Description:

- Building 4042 was a 4,269-square-foot structure with steel sides and a steel roof. It had 38-foot ceilings and contained 4,117 square feet of laboratory space.¹
- Serviced by Substation 4742.

Relevant Site Information:

- Use Authorization 62 was obtained for a period of one year, from February 6, 1973, to February 6, 1974. The authorization was for 15,000 lbs of uranium in the form of UO₂ powder for the Lower Axial Blanket Shielding Experiment.^{1,2} It is unclear whether this experiment was ever conducted.
- In the Site Survey Plan, Building 4042 was incorrectly listed as having a contaminated sodium test loop. This test loop was actually in Building 4023.

Radiological Surveys:

- As part of the DOE SSFL Site Survey, Building 4042 was surveyed to determine if any residual activity was accidentally left behind as a result of operations in support of the SNAP program. Measurements, including exposure rate measurements, were made in Building 4042.¹
 - Maximum gamma: 4.4 µR/hr. (corrected for background and statistically tested against an acceptance limit of 5 µR/hr).
 - Average gamma: 0.1 µR/hr.

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- Based on the median value of exposure rate measurements in the vicinity of 4042, the ambient background value for gamma was determined to be 7.1 $\mu\text{R/hr}$.
- Maximum total-average alpha: 12.6 dpm/100 cm^2 (statistically tested against an acceptance limit of 5,000 dpm/100 cm^2).
- Average total-average alpha: 4.0 dpm/100 cm^2 .
- Maximum removable alpha: 5.9 dpm/100 cm^2 (statistically tested against an acceptance limit of 1,000 dpm/100 cm^2).
- Average removable alpha: 0.5 dpm/100 cm^2 .
- Maximum total-average beta: 1,200 dpm/100 cm^2 (statistically tested against an acceptance limit of 5,000 dpm/100 cm^2).
- Average total-average beta: 775 dpm/100 cm^2 .
- Maximum removable beta: 15.4 dpm/100 cm^2 (statistically tested against an acceptance limit of 1,000 dpm/100 cm^2).
- Average removable beta: 2.8 dpm/100 cm^2 .
- Based on the results of the survey of Building 4042, the conclusion was made that this area passes the criteria for unrestricted use.

Status:

- Building 4042 was demolished in May 2003.

References:

- 1- ETEC Document, GEN-ZR-0013, "Radiological Survey of Buildings T049, T042, T027, T032, and T025," August 26, 1988.
- 2- Rockwell International Document, Use Authorization 62, February 6, 1973.
- 3- Historical Site Photographs from Boeing Database.
- 4- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4042



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Site Summary- Site 4524

Site Identification:

Site 4524
Parking Lot

Operational Use/History:

- Constructed prior to 1962.
- Site 4524 served as a parking lot for personnel working in the SNAP area.
- Demolished in the middle 1960s.¹

Site Description:

- Site 4524 was located near the SNAP area.

Relevant Site Information:

- There are no Use Authorizations and no Incident Reports associated with Site 4524.²

Radiological Surveys:

- Radiological surveys specific to Site 4524 have not been conducted.²
- This area was covered as part of the 1994-1995 Area IV Radiological Characterization Survey.³
 - Background: 15.6 μ R/hr.
 - Acceptable Limit: Less than 5 μ R/hr above background.
 - Survey results were below the acceptable limits.

Status:

- Site 4524 was demolished in the middle 1960s.¹

References:

- 1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 2- Review of Radiation Safety Records Management System, 2003.
- 3- Rocketdyne Document, A4CM-ZR-0011, Rev. A, "Area IV Radiological Characterization Survey," August 15, 1996.

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Site Summary – Site 4536

Site Identification:

Site 4536
Parking Lot
Includes Building 4836, Time Clock
Includes Building 4636, Guard Shack

Operational Use/History:

- Constructed prior to 1962.
- Site 4536 was a parking lot for personnel working in the SNAP facility.
- Site 4536 is now used for storage of non-radiological equipment.

Site Description:

- Site 4536 sits on the west corner of 12th Street and G Street.¹
- Serviced by Time Clock 4836.
- Serviced by Guard Shack 4636.

Relevant Site Information:

- There are no Use Authorizations and no Incident Reports associated with Site 4536.²

Radiological Surveys:

- Radiological surveys specific to Site 4536 have not been conducted.
- This site was included in the Area IV Radiological Characterization Survey, conducted in 1994 through 1995.³
 - Scope/Purpose: Designed to locate and characterize any previously unknown areas of elevated radioactivity in Area IV.
 - Background: 15.6 $\mu\text{R/hr}$.
 - Acceptable Limit: Less than 5 $\mu\text{R/hr}$ above background.
 - The survey found the area to be below acceptable limits.

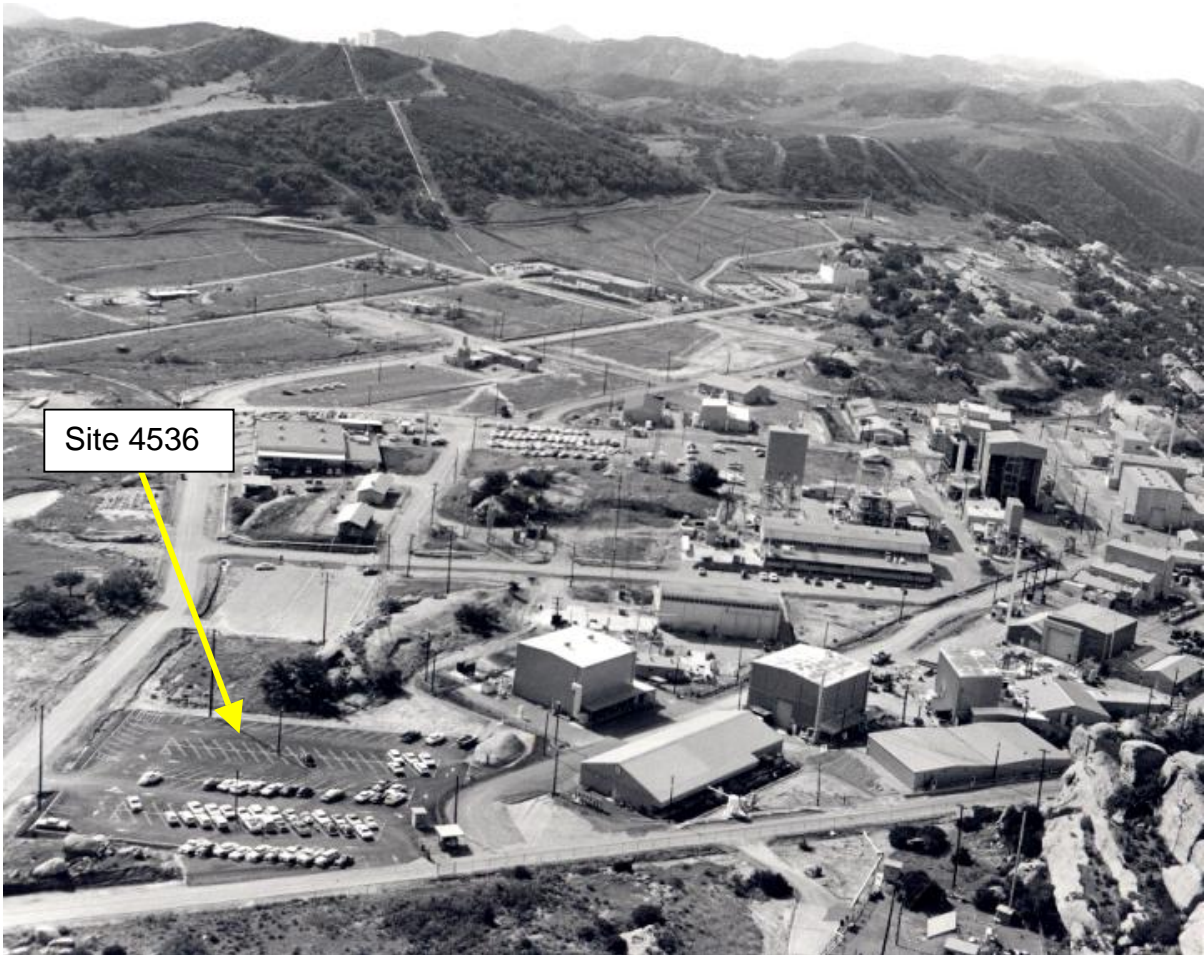
Status:

- Site 4536 is now used for storage of non-radiological equipment.

References:

- 1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 2- Review of Radiation Safety Records Management System, 2003.
- 3- Rocketdyne Document, A4CM-ZR-0011, Rev. A, Area IV Radiological Characterization Survey, August 15, 1996.
- 4- Historical Site Photographs from Boeing Database.

Photograph – Site 4536



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Site Summary –Site 4537

Site Identification:

Site 4537
Parking Lot

Operational Use/History:

- Constructed prior to 1962.
- Site 4537 served as a parking lot for personnel working in the SNAP facility.
- Site 4537 is now used for storage of non-radiological equipment.

Site Description:

- Site 4537 sits adjacent to the SNAP facility.¹

Relevant Site Information:

- There are no Use Authorizations and no Incident Reports associated with Site 4537.²

Radiological Surveys:

- Radiological surveys specific to Site 4537 have not been conducted.
- This site was included in the Area IV Radiological Characterization Survey, conducted in 1994 through 1995.³
 - Scope/Purpose: Designed to locate and characterize any previously unknown areas of elevated radioactivity in Area IV.
 - Background: 15.6 $\mu\text{R/hr}$.
 - Acceptable Limit: Less than 5 $\mu\text{R/hr}$ above background.
 - The survey found the area to be below acceptable limits.

Status:

- Site 4537 is now used for storage of non-radiological equipment.

References:

- 1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 2- Review of Radiation Safety Records Management System, 2003.
- 3- Rocketdyne Document, A4CM-ZR-0011, Rev. A, Area IV Radiological Characterization Survey, August 15, 1996.

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Site Summary – Building 4625

Site Identification:

Building 4625
Non-Nuclear Component Storage Building

Operational Use/History:

- Constructed in approximately 1961.
- Building 4625 operated as a Non-Nuclear Component Storage Building.
- In 1964, an addition was built onto the adjacent Building 4027, filling the gap between Building 4027 and Building 4625. From that point on, Building 4625 was considered part of Building 4027 and no longer referred to separately.¹
 - Building 4027 was built in 1961, and was used as a vibration and shock test facility in support of the SNAP program launch schedule.²
 - There is no record of any activities conducted in Building 4027 involving radioactive or nuclear materials, although Building 4027 may have been used for storing completely sealed radiography sources.²
 - After support work for SNAP tests ceased, Building 4027 was used as storage facility.
- Building 4625 was demolished in 2003.³

Site Description:

- Building 4625 sat directly northwest of Building 4027.⁴
- Building 4625 measures 61 feet 9 inches x 20 feet. In 1963-1964, an addition, measuring 57 feet 9 inches x 49 feet was made to the adjacent Building 4027, filling the space between Buildings 4027 and 4625.²

Relevant Site Information:

- Building 4625/4027 is located in close proximity to RMHF; therefore, direct radiation and skyshine from RMHF affects ambient radiation conditions in the area.²
- There are no Use Authorizations and no Incident Reports associated with Building 4625/4027.⁵

Radiological Surveys:

- As part of the DOE SSFL Site Survey, Building 4625/4027 was surveyed to determine if any residual activity was accidentally left behind as a result of operations in support of the SNAP program. The high bay and storage portions of Building 4625/4027 were surveyed as separate units due to variations in ambient background.²

Group J

- High Bay:
 - Maximum net gamma: 3.8 $\mu\text{R/hr}$ (corrected for background and statistically tested against an acceptance limit of 5 $\mu\text{R/hr}$).
 - Average net gamma: 0.46 $\mu\text{R/hr}$.
 - Based on the median value of exposure rate measurements in the vicinity of 4625/4027, the ambient background value for gross gamma was determined to be 9.09 $\mu\text{R/hr}$.
 - All beta surface activity measurements made “for indication” showed no detectable activity.
 - Based on the results of the interior survey of Building 4625/4027, the conclusion was made that this area passes the criteria for unrestricted use.
- Storage
 - Maximum net gamma: 2.8 $\mu\text{R/hr}$ (corrected for background and statistically tested against an acceptance limit of 5 $\mu\text{R/hr}$).
 - Average net gamma: -1.26 $\mu\text{R/hr}$.
 - Based on the median value of exposure rate measurements in the vicinity of 4625/4027, the ambient background value for gross gamma was determined to be 17.40 $\mu\text{R/hr}$.
 - All beta surface activity measurements made “for indication” showed no detectable activity.
 - Based on the results of the exterior survey of Building 4625/4027 and the storage yard, the conclusion was made that this area is not contaminated and passes the criteria for unrestricted use.

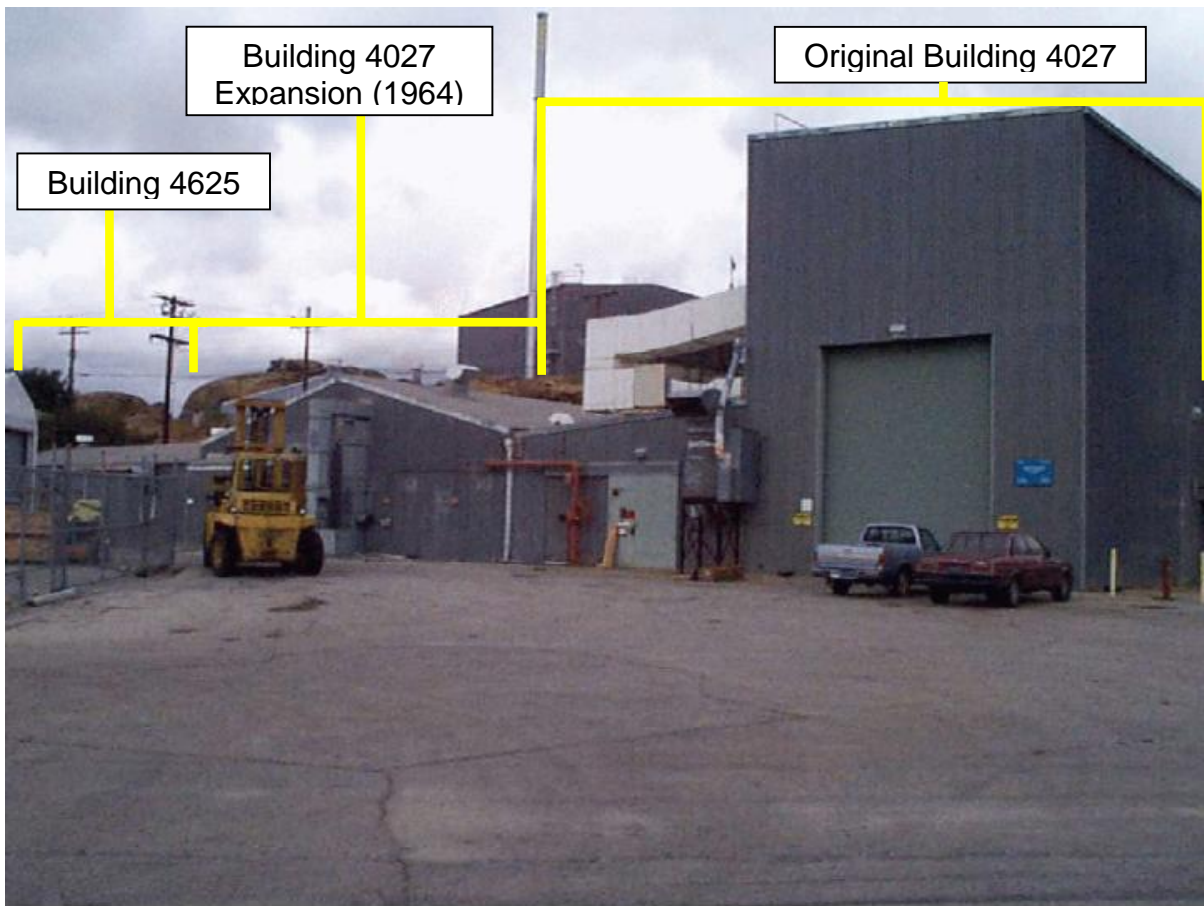
Status:

- Building 4625/4027 was demolished in 2003.³

References:

- 1- Drawing 303-027-A4, “Expansion of Non-Nuclear Mechanical Vibration and Shock Testing, Building 027 Expansion, Floor Plan, as built,” 1964.
- 2- ETEC Document, GEN-ZR-0013, “Radiological Survey of Buildings T049, T042, T027, T032, and T025,” August 26, 1988.
- 3- Personnel Interview, Dan Trippeda, September 23, 2003.
- 4- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 5- Review of Radiation Safety Records Management System, 2003.
- 6- Historical Site Photographs from Boeing Database.

Photograph – Building 4625 as part of 4027



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Site Summary – Building 4927

Site Identification:

Building 4927
Nitrogen Storage Tank

Operational Use/History:

- Constructed prior to 1962.¹
- Building 4927 was most likely demolished in the 1970s, when the site began using a high-pressure nitrogen system. This involved piping in nitrogen from Area III, eliminating the need for most Area IV nitrogen storage tanks.²

Site Description:

- Building 4927 was located southeast of Building 4025, between Building 4924 on the east and Building 4928 on the west.¹

Relevant Site Information:

- Building 4927 was used to store nitrogen. Documents outlining which buildings the storage tank serviced could not be located; however, the Facility Area Plan of inert gas shows that the adjacent Building 4025 was serviced by high-pressure nitrogen system. Before the system was installed, Building 4927 most likely serviced Building 4025.³
- There are no Use Authorizations and no Incident Reports associated with Building 4927.⁴

Radiological Surveys:

- Radiological surveys specific to Building 4927 have not been conducted.
- This site was included in the Area IV Radiological Characterization Survey, conducted in 1994 through 1995.⁵
 - Scope/Purpose: Designed to locate and characterize any previously unknown areas of elevated radioactivity in Area IV.
 - Background: 15.6 μ R/hr.
 - Acceptable Limit: Less than 5 μ R/hr above background.
 - The survey found the area to be below acceptable limits.

Status:

- Building 4927 was demolished in the 1970s.

Group J

References:

- 1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 2- Personnel Interview, Randy Ingersoll, September 23, 2003.
- 3- Drawing, 303-GEN-C254, "Santa Susana Facility Area Plan Inert Gas Master East," As Built to Date, February 22, 1991, Ref # PEWR 75184.
- 4- Review of Radiation Safety Records Management System, 2003.
- 5- Rocketdyne Document, A4CM-ZR-0011, Rev. A, Area IV Radiological Characterization Survey, August 15, 1996.

Group K

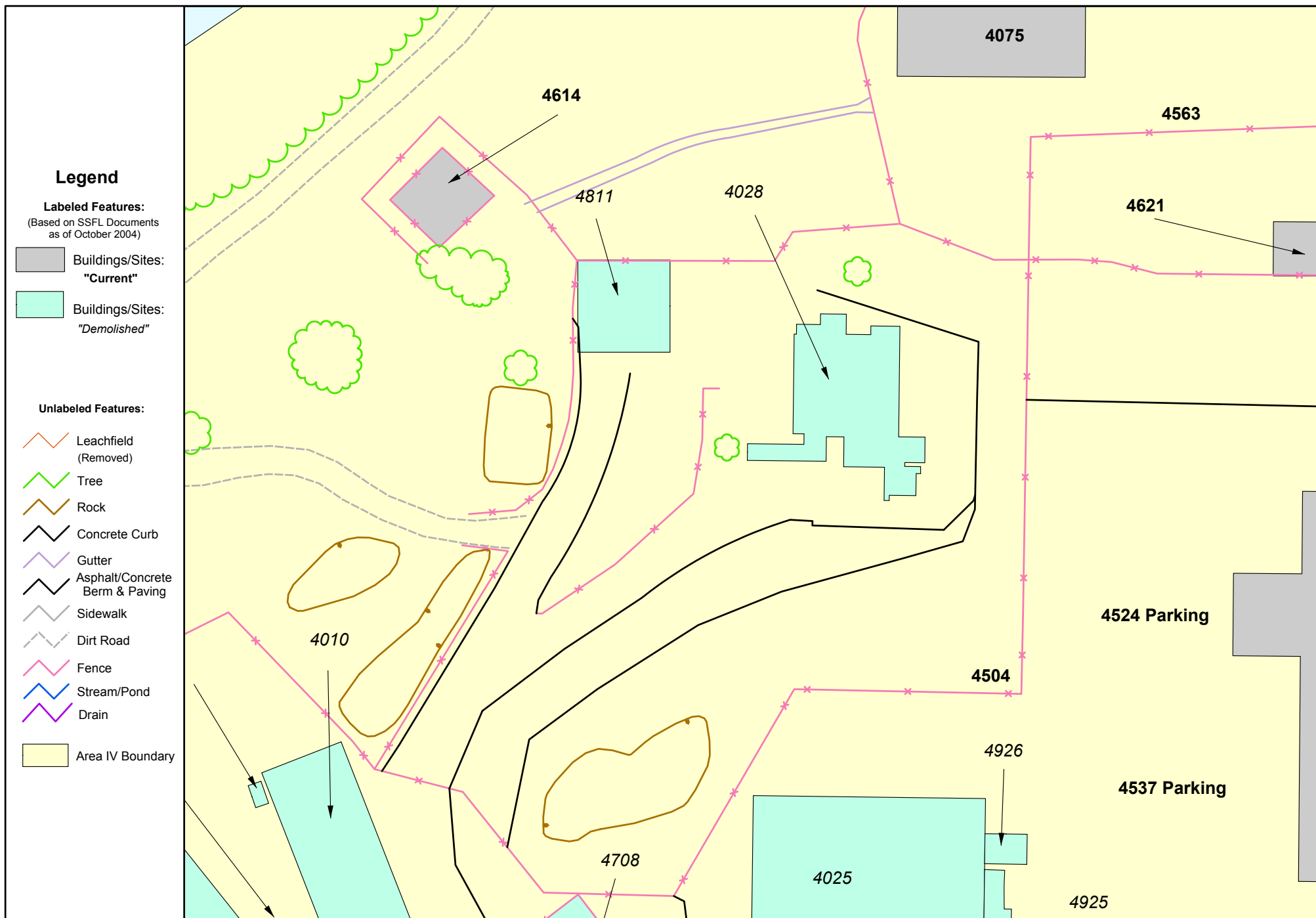
Group K Map

Building 4028

Includes Site 4811, Electrical and Mechanical Equipment Pad

Building 4504

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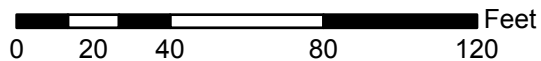


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CONSULTING INC



1 inch equals 50 feet



DATE:

May 2005

Site Summary Group K
AREA IV
Santa Susana Field Laboratory, CA

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Site Summary – Building 4028

Site Identification:

Building 4028
Shield Test Irradiation Reactor (STIR) Facility
Shield Test Reactor
Liquid Metal Fast Breeder Reactor (LMFBR) Fuel Safety Building
Includes Site 4811, Electrical and Mechanical Equipment Pad

Operational Use/History:

- Constructed in 1960.
- Building 4028 was constructed to perform tests on space reactor shields.¹
- The original reactor was the Shield Test Reactor, a 50 kW swimming pool type reactor that operated from 1961 to 1964.¹
- The reactor was modified in 1964 to become the STIR; a 1 MW reactor that operated from 1964 to 1972.¹
- Site 4811, which was located adjacent to Building 4028, became part of Building 4028 between 1962 and 1967. Site 4811 was a mechanical and electrical pad that held equipment directly supporting the STIR facility reactor.
- In March of 1976, STIR was decommissioned and removed from Building 4028.¹
- From 1977 to 1981, Building 4028 was used to conduct research on the behavior of molten UO₂, causing the building to again become contaminated.¹
- Operations were terminated in 1984, and the building remained inactive until 1988 when cleanout and decontamination began.¹
- Decommissioning and demolition (D&D) was conducted in 1988. Activities included the removal of surplus uranium oxide, decontamination and removal of equipment and electrical components, removal of the radioactive ducting system, decontamination of the building surfaces, miscellaneous cleanup operations and the final radiological survey of the facility.¹
- The above-ground structures were removed in 1989 and the below-ground structures were removed in 1998.^{1,2}

Site Description:

- Building 4028 was a 14-foot tall steel-framed structure covered with steel siding and roofing built on top of a concrete test vault. The test vault was 60 square meters with a 6 foot ceiling.^{1,3}
- Site 4811 was a concrete electrical and mechanical pad. It housed a cooling tower, heat exchanger, ventilation equipment and an air-cooled condenser, which supported the STIR facility.^{1,3}
- Building 4028 had a high-efficiency particulate air (HEPA) exhaust system and stack.^{1,3}

Group K

- Records do not indicate there was a radiological waste holdup tank associated with Building 4028. Given the building's location, it is likely that waste water was discharged to the 4614 Drainage Sump.²
- Serviced by Site 4811, Electrical and Mechanical Equipment Pad.

Relevant Site Information:

- There have been five incidents associated with Building 4028 that could have resulted in a release to the environment:
 - On July 17, 1963, an unmarked irradiated fission foil was moved in a private car to a clean office (A0447).
 - On June 17, 1965, an employee received an extremity beta exposure resulting from the handling of a plastic bag sealed with green tape containing chemical samples which were irradiated for 1000 seconds at 1 Mw (A0279).
 - On January 10, 1978, there was a small Uranium fire in the arc-melting furnace (A0065).
 - On January 30, 1979, increased radioactivity was found in runoff water from Radioactive Materials Disposal Facility. The estimated total activity released to the pond was approximately 0.36 mCi of gross beta activity (A0232).
 - On July 24, 1981, a contaminated crucible stored outside was exposed to elements (A0087).

Radiological Surveys:

- On September 15, 1988, a site water runoff analysis was conducted as part of the D&D effort. It determined that there was no detectable activity.⁴
- In 1988, a final survey of the total facility was conducted after the completion of D&D to verify that the radiation levels of the facility had been reduced to <0.1 mrad/hr. The survey consisted of an ambient contamination detection scan inside the building and throughout the fenced in area (based on Industrial Planning Maps and the survey map the fenced in area includes Building 4504 – Classified Scrap and S.S. Materials Storage).^{3,5}
 - The survey concluded that the facility beta-gamma surface contamination levels were all <0.1 mrad/hr.
 - Measured beta-gamma surface contamination ranged from 0.02 to 0.07 mrad/hr (limit is 1.0 mrad/hr).
- Rockwell International conducted a D&D survey in 1989. The survey covered the interior (above and below grade portions) and the surrounding area of Building 4028 through direct radiation sampling, exposure rates and surface sampling.¹
 - Indication surveys for contamination conducted in the non-radiological controlled areas of the building found no detectable activity.
 - Alpha and beta measurements were made in the radiological controlled areas.
 - Total alpha: 12.3 dpm/100cm² average.
 - Maximum alpha: 72.8 dpm/100cm².

- Alpha acceptable limit: 5,000 dpm/100cm²).
 - Total beta: 523 dpm/100cm² average and 1,303 dpm/100cm² maximum.
 - Beta acceptable limit: 5,000 dpm/100cm².
 - Removable alpha: 5.1 dpm/100cm² average and 109 dpm/100cm² maximum.
 - Removable alpha acceptable limit: 1,000 dpm/100cm².
 - Removable beta: 14.7 dpm/100cm² average and 307 dpm/100cm² maximum.
 - Removable beta acceptable limit: 1,000 dpm/100cm².
 - Ambient gamma in the above grade levels: 0.2 µR/hr average and 1.0 µR/hr maximum (adjusted for background).
 - Ambient gamma in the below grade levels: -0.7 µR/hr average and 2.3 µR/hr maximum (adjusted for background).
 - Acceptable limit: 5 µR/hr above background.
 - The survey concluded that the facility met the release criteria for unrestricted use.
- Oak Ridge Institute for Science and Education conducted a survey to verify the results of the final radiation survey performed by Rockwell in 1989. The survey covered the Old Conservation Yard, Building 4064 and Building 4028. Surface scans and surface activity levels were measured for Building 4028.⁶
 - The survey concluded that Building 4028 met the release criteria for unrestricted use.
 - Surface scans for alpha, beta and gamma activity of the above-ground concrete slab, below-grade vault, and the stairway did not identify any areas of elevated direct radiation.
 - Surface activity measurements for alpha contamination in a grid block were <83 dpm/100cm² average and individual direct measurements ranged from <83 to 89 dpm/100cm² (limit is 5,000 dpm/100cm² average and 15,000 dpm/100cm²). Beta contamination measurements in a grid block were between <860 and 1,200 dpm/100cm² average and individual direct measurements ranged from <860 to 1,400 dpm/100cm² (limit is 5,000 dpm/100cm² average and 15,000 dpm/100cm²).
 - Removable gross alpha contamination was <12 dpm/100cm² (limit is 1,000 dpm/100cm²). Removable gross beta contamination ranged from <15 to 25 dpm/100cm² (limit is 1,000 dpm/100cm²).
- DHS performed verification sampling in 1992.

Status:

- The California Department of Health Services (DHS) concurred with release of Building 4028 for unrestricted use in December 1995.⁷
- The Department of Energy (DOE) released Building 4028 without radiological restrictions in April 1997.⁸

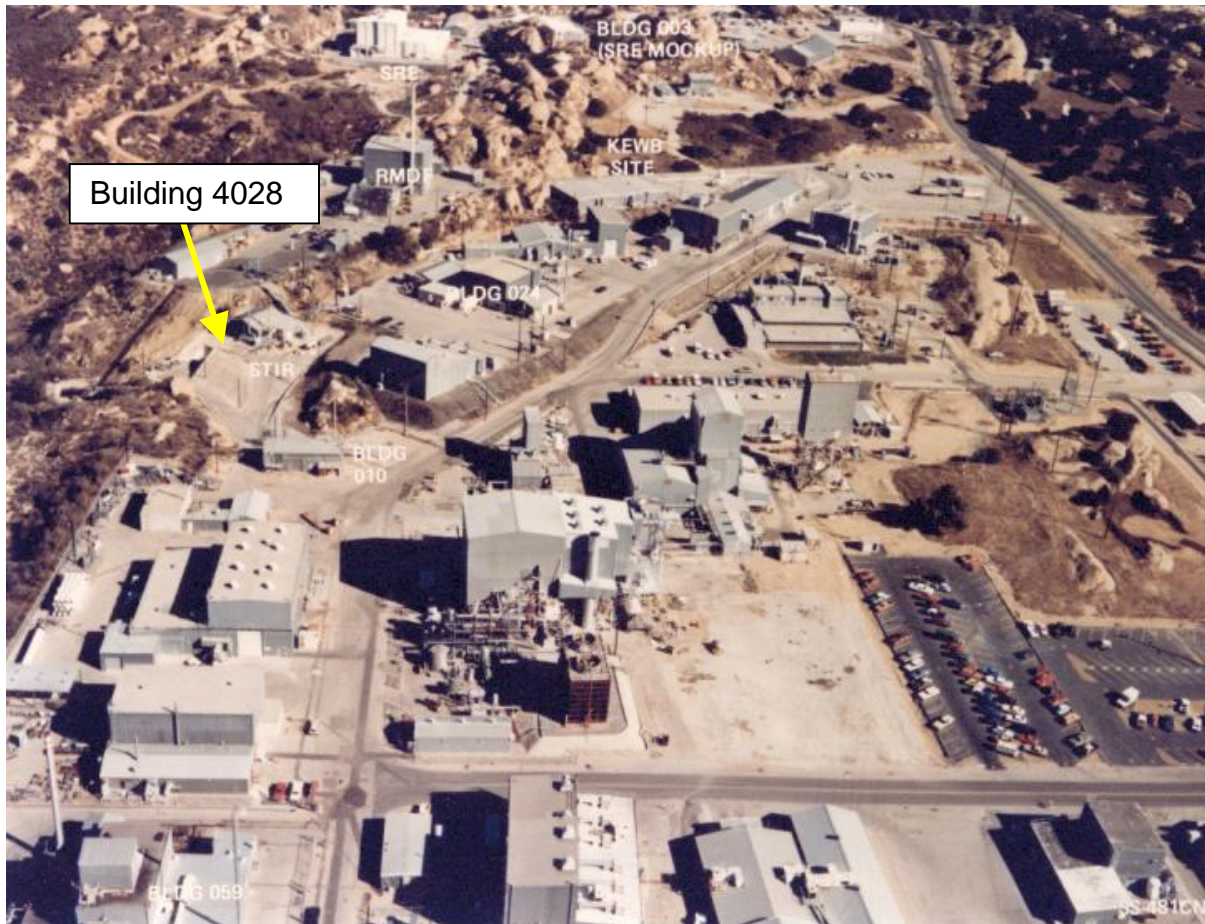
Group K

- The above grade portion of the building was demolished in 1989, and the concrete slab floor, test vault and stairway were demolished in 1998.²

References:

- 1- Rockwell International Report, N704SRR990033, "Final Decontamination and Radiological Survey of Building T028," February 27, 1991.
- 2- Personnel Interview, Rod Meyer, September 25, 2003.
- 3- Rockwell International Report, AI-ERDA-13168, "STIR Facility Decontamination and Disposition Final Report," August 26, 1976.
- 4- Rockwell International Report, N001TI000322, "Building T028 Decontamination and Demolition Final Report," June 6, 1990.
- 5- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 6- ORISE Report, 93/J-107, "Verification Survey of the Old Conservation Yard, Building T064 Side Yard, and Building T028, Santa Susana Field Laboratory, Rockwell International, Ventura County, California," October, 1993.
- 7- DHS/RHB, Letter, "Rocketdyne's letter dated July 6, 1995 with attachments concerning the release of Buildings T029, T028 and OCY," from Gerard Wong (DHS/RHB) to Phil Rutherford, December 21, 1995.
- 8- DOE-ER, Letter, "Release of Decontaminated Building 028 without Radiological Restrictions at ETEC," from Sally Robinson (DOE-ER) to Roger Liddle, April 2, 1997.
- 9- Historical Site Photographs from Boeing Database.

Photograph – Building 4028



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Site Summary – Building 4504

Site Identification:

Building 4504
Classified Scrap and Salvageable Steel (S.S.) Material Storage Area

Operational Use/History:

- Constructed prior to 1964.¹
- Building 4504 was used to store classified scrap and S.S.
- The site was no longer in use as of the STIR facility D&D effort in 1988.²
- DHS concurred that Building 4504 met the approved standards for unrestricted release in December 1995.³
- DOE released the facility without radiological restrictions April 1997.⁴

Site Description:

- The classified scrap and S.S. material storage area was part of the STIR facility (based on Industrial Planning Maps and survey maps of STIR facility), it is a fenced in area at the southeast corner of the STIR facility fence.¹

Relevant Site Information:

- There are no incidents that could have resulted in releases to the environment associated with Building 4504.⁵

Radiological Surveys:

- A final survey of the total facility was conducted in 1988 after the completion of D&D to verify that the beta-gamma surface contamination levels of the STIR facility had been reduced to <0.1 mrad/hr. The survey consisted of an ambient contamination detection scan inside the building and throughout the fenced in area (based on Industrial Planning Maps and the survey map the fenced in area includes Building 4504 – Classified Scrap and S.S. Material Storage).^{1,2}
 - The survey concluded that the STIR facility beta-gamma surface contamination levels were all <0.1 mrad/hr.
 - Measured beta-gamma surface contamination ranged from 0.02 to 0.07 mrad/hr (limit is 1.0 mrad/hr).

Status:

- DHS concurred that Building 4504 met the approved standards for unrestricted release in December 1995.³
- DOE released the site without radiological restrictions in April 1997.⁴

Group K

- The classified scrap and S.S. material storage area is no longer in service and is currently an empty lot.

References:

- 1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 2- Rockwell International Report, AI-ERDA-13168, "STIR Facility Decontamination and Disposition Final Report," August 26, 1976.
- 3- DHS/RHB, Letter, "Rocketdyne's letter dated July 6, 1995 with attachments concerning the release of Buildings T029, T028 and OCY," from Gerard Wong (DHS/RHB) to Phil Rutherford, December 21, 1995.
- 4- DOE-ER, Letter, "Release of Decontaminated Building 028 without Radiological Restrictions at ETEC," from Sally Robinson (DOE-ER) to Roger Liddle, April 2, 1997.
- 5- Review of Radiation Safety Records Management System, 2003.
- 6- Historical Site Photographs from Boeing Database.

Photograph – Building 4504



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Group L

Group L Map

Building 4010

Includes Site 4807, Electrical Equipment Pad

Includes Site 4808, Electrical Equipment Pad

Includes Site 4809, Air Blast Heat Exchanger Pad

Building 4012

Includes Building 4713, Substation

Building 4013

Includes Building 4713, Substation

Includes Building 4823, Time Clock

Includes Building 4413, Uninterruptible Power Supply (UPS)

Building 4019

Includes Building 4719, Substation

Building 4228

Includes Building 4708, Substation for Inbound Power

Includes Site 4807, Electrical Equipment Pads

Includes Site 4808, Electrical Equipment Pads



Includes Site 4809, Air Blast Heat Exchanger Pad

Includes Building 4710, SCTI Power Pak Cooling Tower






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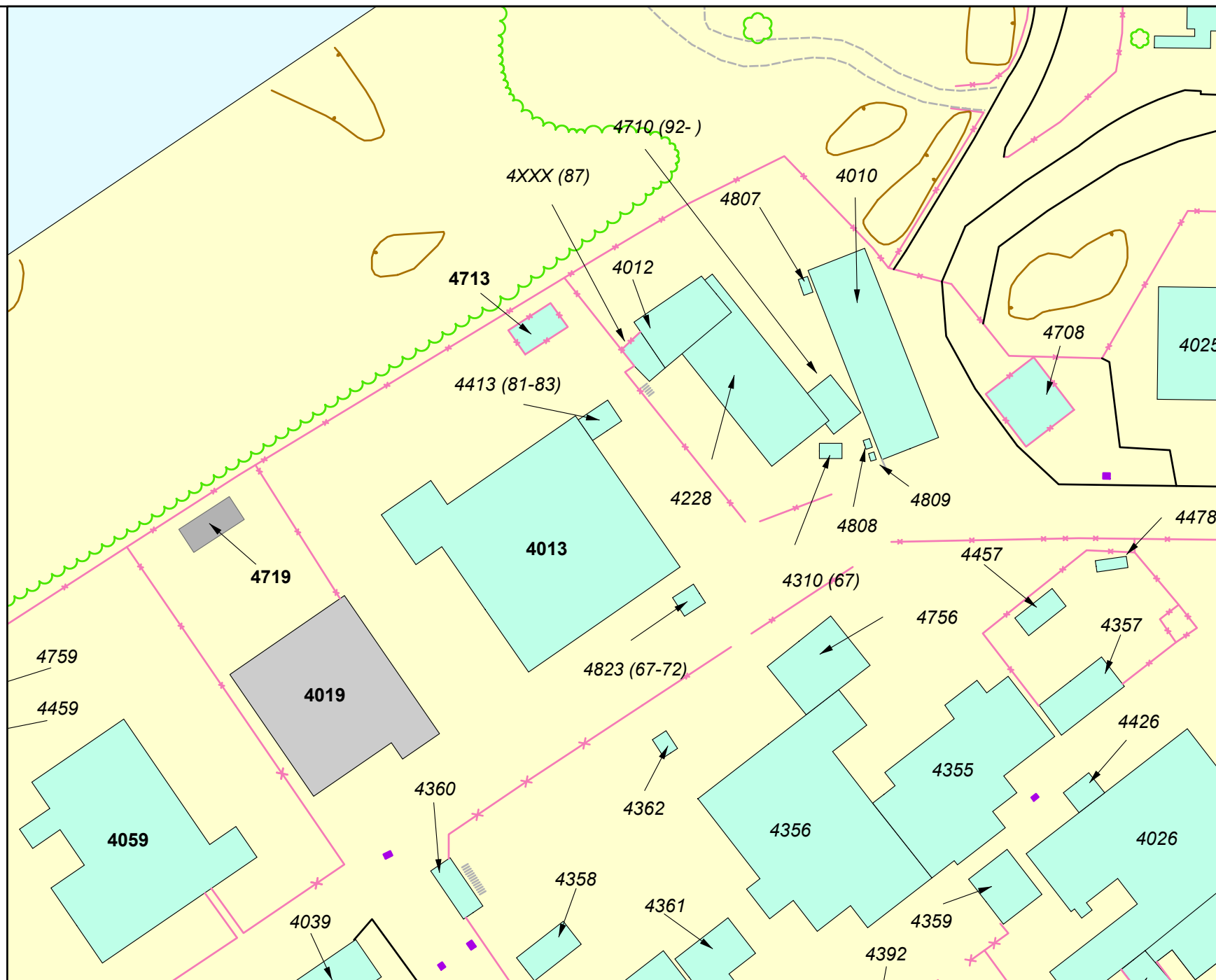
Legend

Labeled Features:
(Based on SSFL Documents
as of October 2004)

-  Buildings/Sites:
"Current"
-  Buildings/Sites:
"Demolished"

Unlabeled Features:

-  Leachfield
(Removed)
-  Tree
-  Rock
-  Concrete Curb
-  Gutter
-  Asphalt/Concrete
Berm & Paving
-  Sidewalk
-  Dirt Road
-  Fence
-  Stream/Pond
-  Drain
-  Area IV Boundary



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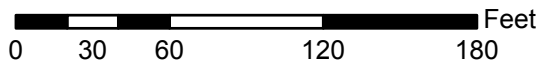
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CONSULTING INC

DATE:

May 2005



1 inch equals 75 feet



Site Summary Group L

AREA IV

Santa Susana Field Laboratory, CA

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Site Summary – Building 4010

Site Identification:

Building 4010

Systems for Nuclear Auxiliary Power (SNAP) 8 Experimental Reactor (S8ER)

Facility

Includes Site 4807, Electrical Equipment Pad

Includes Site 4808, Electrical Equipment Pad

Includes Site 4809, Air Blast Heat Exchanger Pad

Operational Use/History:

- Constructed in 1959.
- Building 4010 was used for the 50 kWt SNAP 2 Experimental Reactor test. After completion of the SNAP 2 test on November 19, 1960, the reactor and associated test equipment were removed from the building.¹
- In 1961, modifications were made to allow the safe operation of the facility with the S8ER. Tests of the S8ER began in 1963 and following completion of the SNAP 8 tests on April 15, 1965, the reactor and associated test equipment were removed from the building.¹
- In 1974, the S8ER was declared excess to the government's needs.²
- In September 1977, removal of all radioactive materials began. Activities included removing the reactor containment vessel and razing the building.²
- Demolished in 1978 after decontamination.³

Site Description:

- Building 4010 was a rigid, steel-framed structure with corrugated metal siding and roofing. It was 60 feet long by 24 feet wide, with 17-foot ceilings.²
- The subsurface structure of Building 4010 was at least 14 feet below grade. This structure contained three steel reinforced concrete vaults, two of which were lined with steel.²
 - The primary containment vessel consisted of a 38-inch diameter by 15.5-foot high carbon steel pressure vessel embedded in concrete ranging from 18 to 27 inches thick.⁴
 - The primary system vault consisted of a carbon steel vault liner embedded in concrete. Removable shield plugs covered the top.²
 - The secondary equipment pit was a small, unlined concrete vault. All passageways to the primary vault were welded shut to prevent exposure.²
- The amount of radioactive waste produced by test reactor operations was minimal, so major waste collection and processing systems were not included in Building 4010.²

Group L

- The building was surrounded by several small concrete pads (Site 4807, Site 4808 and Site 4809) that were initially labeled separately, but were absorbed by the 4010 footprint by 1964.

Relevant Site Information:

- The change room was connected to a septic tank and leach field located west of Building 4010 until 1961, when the central sanitary sewer system became available.¹
- Building 4010 was eventually abandoned in place; it was later removed.⁵
- The entire vault complex was provided with a sub-foundation drainage system consisting of circuits of perforated metal pipe surrounded by gravel fill. The system drained into a pipe well sump at the east end of the building. From the sump, water was pumped into a tank for controlled disposal if contaminated, or released to the surface drainage system if it tested clean.¹
- Three incidents occurred in Building 4010 that could have resulted in a release to the environment:
 - On April 30, 1961, it is known that an incident occurred, however, no details of the incident could be found. Incident Report A0598, dated June 27, 1961 referenced the April incident, but only indicated that the processing of samples from the April incident would be delayed (A0598).
 - On January 1, 1964, fission product was released to the cover gas and NaK coolant as a result of cladding failure of SNAP-8 reactor fuel (A0277).
 - On October 19, 1965, cutting of the control drum drive rods resulted in Co-60, Mn-54 and Fe-59 contamination in the high bay area. The level of contamination was found to be 200 mrad/hr, including 100 mR/hr due to gamma. The contamination was cleaned and no workers received an unacceptable exposure (A0349).

Radiological Surveys:

- Guide limits for the cleanup were as follows:⁶
 - Beta-gamma emitters:
 - 0.1 mrad/hr at 1 cm total.
 - 1000 dpm/100 cm² removable.
 - Alpha emitters:
 - 100 dpm/100 cm² total.
 - 20 dpm/100 cm² removable.
 - Activated soil:
 - As close to background as practicable, but not greater than 100 pCi/g gross detectable beta activity.
- Prior to demolition, Atomics International personnel conducted a survey to determine the level of radioactivity in activated structures within Building 4010.⁴

- The principal nuclides in the reactor containment vessel and cooling coils were Mn-54 and Fe-55. The total specific activity of these contaminants was $5.1 \times 10^1 \mu\text{Ci/gm}$ and the total activity was $3.6 \times 10^7 \mu\text{Ci}$.
- The principal nuclides in the reinforcing rods were Mn-54 and Fe-55. The total specific activity of these contaminants was $5.1 \times 10^2 \mu\text{Ci/gm}$ and the total activity was $3.1 \times 10^7 \mu\text{Ci}$.
- The principal nuclides in ordinary concrete were tritium, Ar-39, Ca-41, Fe-55, Co-60 and C-14. The total specific activity of these contaminants was $8.7 \times 10^2 \mu\text{Ci/gm}$ and the total activity was $3.8 \times 10^8 \mu\text{Ci}$.
- The principal nuclide in high-density concrete was Fe-55. The maximum specific activity of this contaminant was $2.2 \times 10^2 \mu\text{Ci/gm}$.
- The principal nuclide in the thermobestos insulation was Ca-41. The specific activity of this contaminant was $5.5 \times 10^{-1} \mu\text{Ci/gm}$ of insulation.
- The principal nuclide in silver braze of the shielding was Ag-108. The maximum specific activity of this contaminant was $1.4 \times 10^4 \mu\text{Ci/gm}$.
- The principal nuclides in stainless steel of the shield were Mn-54 with specific activity level of $1.9 \times 10^{-1} \mu\text{Ci/gm}$, Fe-55 with a specific activity level of $3.2 \times 10^1 \mu\text{Ci/gm}$, Ni-63 with a specific activity level of $1.7 \times 10^1 \mu\text{Ci/gm}$ and Co-60 with a specific activity level $5.6 \times 10^1 \mu\text{Ci/gm}$.
- The principal nuclides in stainless steel of the instruments in the reactor vessel thimbles were Mn-54 with a specific activity level of $6.8 \times 10^{-2} \mu\text{Ci/gm}$, Fe-55 with a specific activity level of $1.1 \times 10^1 \mu\text{Ci/gm}$, Ni-63 with a specific activity level of $6.1 \times 10^0 \mu\text{Ci/gm}$ and Co-60 with a specific activity level of $2.1 \times 10^1 \mu\text{Ci/gm}$.
 - A radiation measurement taken in the reactor vault indicated maximum radiation levels of 120 R/hr. The activated stainless steel in the thimbles was thought to be the source of this reading.
- During dismantlement and excavation activities, water and air samples were collected to assure the safety of workers and to monitor the discharge of effluents.²
 - None of the water samples indicated concentrations greater than $4.5 \times 10^{-8} \mu\text{Ci/ml}$ beta—well below the limit of $3 \times 10^{-7} \mu\text{Ci/ml}$ for Sr-90.
 - None of the air samples indicated radioactive particulate concentrations exceeding $10^{-11} \mu\text{Ci/ml}$ beta, other than naturally occurring airborne radioactivity. The limit for Co-60 is $3 \times 10^{-10} \mu\text{Ci/ml}$.
- Following demolition in 1977-1978, Atomics International personnel conducted a radiological survey to verify that remediation attained accepted cleanup levels to support unrestricted release.⁵
 - Approximately 200 smears for removable contamination were taken on concrete, piping and steel.
 - No smears were found to exceed 50 dpm/100 cm² for beta.
 - Alpha contamination was not expected in this area, and none was detected.

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- In a complete walk-through survey, the maximum surface contamination detected was 0.05 mrad/hr. Average background is 0.04 mrad/hr. All readings were below the 0.1 mrad/hr limit.
- Prior to backfilling, concrete samples were taken from a portion of a vault wall. All samples were less than 50 pCi/g gross beta. [All clean concrete was used as backfill for ditch repair between Area 1 and Area 2.]
- Soil samples were collected in the area after the excavation was filled with clean backfill. All samples were less than 50 pCi/g gross beta.
- During the dismantling of the sump drain system and vessel pit, water samples were collected and no samples exceeded 4.5×10^{-8} $\mu\text{Ci/cc}$, below the limit of 3×10^{-7} $\mu\text{Ci/cc}$ for Sr-90.
- In September of 1979, the Formerly Utilized Sites Remedial Action Program (FUSRAP) Survey Group from Argonne National Laboratory conducted a certification survey to ensure that the facility met unrestricted release criteria. At the time of the survey, the building had already been demolished and the asphalt parking area was already in place.⁶
 - The survey included a walkover, soil borings through the asphalt and soil coring.
 - The walkover survey indicated some elevated reading on the asphalt pad, ranging from 15-30 $\mu\text{R/hr}$ (natural background is 9-15 $\mu\text{R/hr}$).
 - Further investigation revealed that elevated reading were most likely a result of radioactive materials stored on the hill to the east (Radioactive Material Handling Facility (RMHF)).
 - The soil borings indicated that no U-235 or U-238 were present. Other nuclides were found in the following ranges:
 - Cs-137 from 0.00 ± 0.00 pCi/g to 0.42 ± 0.03 pCi/g;
 - Th-232 from 0.147 ± 0.23 pCi/g to 2.27 ± 0.16 pCi/g;
 - Ra-226 from 0.358 ± 0.081 pCi/g to 3.46 ± 0.24 pCi/g;
 - Co-60 from <0.03 pCi/g to 7.32 ± 0.07 pCi/g.
- In November of 1979 and October of 1981, the FUSRAP Survey Group from Argonne National Laboratory revisited Building 4010 to conduct a certification survey to ensure that the facility continued to meet unrestricted release criteria. At the time of the survey, the building had already been demolished and the asphalt parking area was already in place.⁷
 - The survey confirmed the results of the previous Argonne survey, and the following conclusions were developed:
 - The Co-60 found in soil was well below the criteria set by the Department of Energy (DOE) for the site.
 - Gamma background readings at the surface were influenced by shine from the RMHF. The Co-60 found in soil was not believed to contribute to the total background readings.
 - The site met the criteria for an unrestricted release.

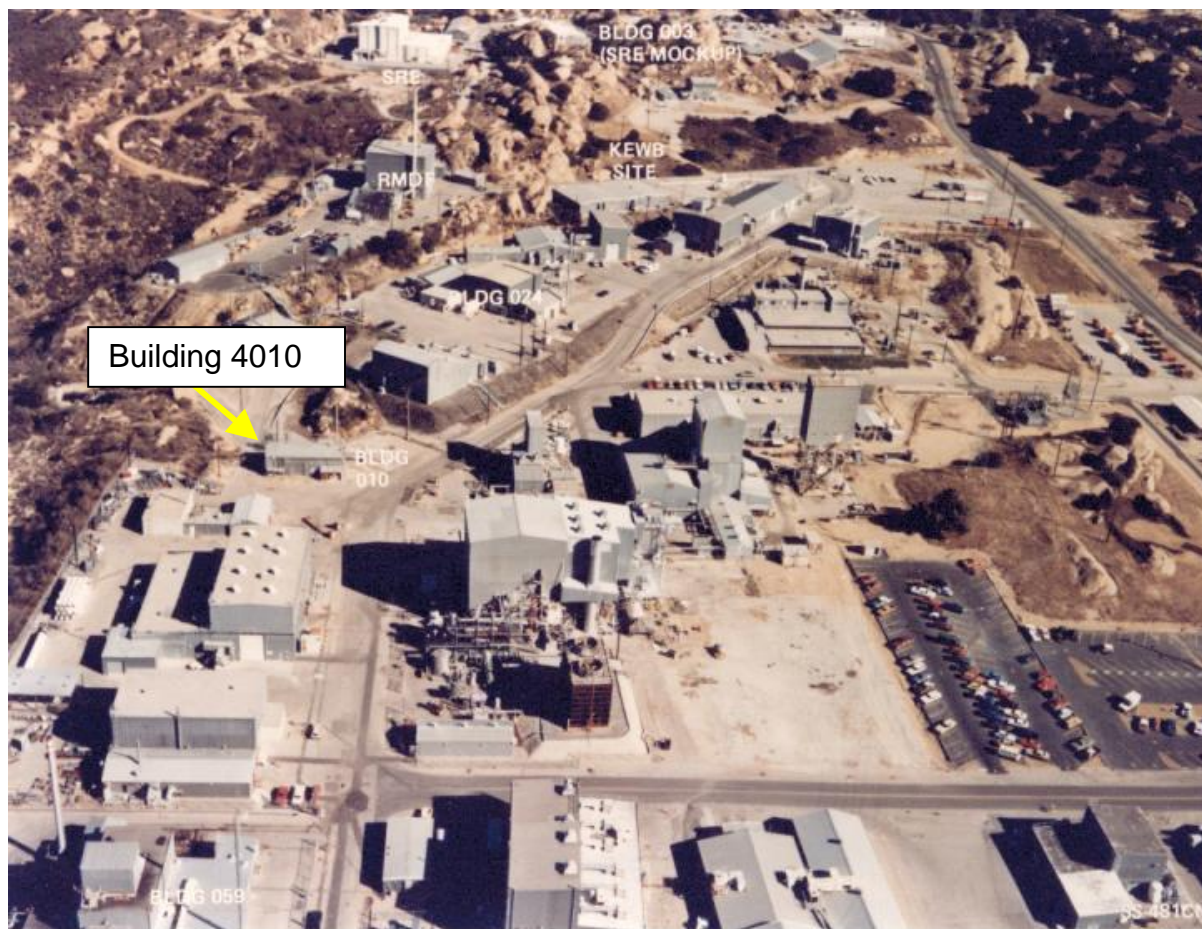
Status:

- DOE released Building 4010 for unrestricted use December 12, 1982.⁸
- Building 4010 was decontaminated and demolished in 1977-1978.
- Following demolition, an asphalt parking lot was built where the Building 4010 once stood.²

References:

- 1- Rockwell International Document, N704FDP990005, "Facilities Dismantling Plan for Building 010 (S8ER)," December 10, 1976.
- 2- Rockwell International Document, ESG-DOE-13237, "S8ER Facilities Decommissioning Final Report," February 28, 1979.
- 3- Rockwell International Document, Use Authorization No. 111, "Decontamination and Disposition of Building 010," January 16, 1978.
- 4- Atomics International Document, SA-652-130-002, "Determination of Levels of Radioactivity and Significant Radionuclides Present in Neutron-Activated Structures in Building T010," June 28, 1973.
- 5- Rockwell International Document, N704TI990041, "Radiological Survey Results—Release to Unrestricted Use, Building 010 at SSFL," August 28, 1978.
- 6- Argonne National Laboratory Report, no document number, "Certification Survey of the SNAP 8 Experimental Reactor (S8ER) Facility in Building 10, Santa Susana Field Laboratories of the Energy Systems Group of Rockwell International at Santa Susana, California," September 1979.
- 7- Argonne National Laboratory Report, no document number, "Interim Post Remedial Action Survey Report for Systems for Nuclear Auxiliary Power-8 (SNAP-8) Experimental Reactor Facility (Building 010), Santa Susana Field Laboratory, Rockwell International, Canoga Park, California," May 1983.
- 8- Rockwell International, Letter #2726, "S8ER Facilities Decommissioning Final Report Number ESG-DOE-13237," from Len Lanni (DOE) to C. C. Connors (Atomics International), December 15, 1982.
- 9- Historical Site Photographs from Boeing Database.
- 10- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4010



Site Summary – Building 4012

Site Identification:

Building 4012
SNAP Critical Test Facility Number 2
Heavy Metal Reflected Fast Spectrum Reactor Critical Test Facility
Energy Technology Engineering Center (ETEC) X-Ray Facility/Storage
Includes Building 4713, Substation

Operational Use/History:

- Constructed prior to 1962.¹⁰
- Building 4012 Operated with SNAP critical assemblies intermittently between 1962 and 1968.¹
- In 1969 and 1970, the critical assembly machine was modified for use in the Heavy Metal Reflected Fast Spectrum Reactor (HMRFSR) project and operated for the HMRFSR project from 1970 to 1972.¹
- In 1979, the concrete portion of Building 4012 was modified for use as an x-ray and source radiography facility.¹
- Building 4012 operated as ETEC X-Ray Facility and Storage from 1979 to 1992.¹
- Demolished in 2003.

Site Description:

- Building 4012 had 1,292 square feet of floor space. In 1986, the passageway and metal portion containing the operations and control rooms of Building 4012 were demolished in order to build the ETEC Sodium Component Test Installation (SCTI) Power Pak section of the Cogeneration Project.¹
- The remaining concrete vault consisted of two rooms, Room 109 (fuel storage/equipment room) and Room 110 (critical cell). A 20-inch borated concrete wall containing fuel storage tubes divided Room 109. An air conditioning duct ran the length of the room over the fuel storage area.
- The critical cell (Room 110) was a concrete chamber with 4-foot thick concrete walls lined with steel and was secured by a heavy shield (vault-type) door.¹
- Serviced by Substation 4713.

Relevant Site Information:

- Radioactive material was managed at Building 4012. The potential contaminants of concern are primarily Cs, Sr, U, Th and Pu.¹
- There are no Incident Reports associated with Building 4012.²

Radiological Surveys:

- In 1985, a comprehensive radiological survey of Building 4012 and surrounding areas was performed.³
 - Allowable limits: Ambient exposure of rate $<5 \mu\text{R/hr}$ above background at 1 meter.
 - Radiological contamination was not detected in the radiography room, radiographer's office and dark room.
 - Contamination levels (maximum dpm was 6,500 dpm alpha/100 cm^2) in rooms 109 and 110 were found to require radiological monitoring and control of waste disposal.
- Initial demolition efforts in Building 4012 were completed in 1986 to accommodate the construction of the Power Pack section of the SCTI Cogeneration Project.⁴
- Final decontamination and decommissioning (D&D) of the remaining portion of Building 4012 was performed in 1995.¹
- Following D&D efforts, a comprehensive final radiological survey was completed.⁴
 - Allowable limits: $<5 \mu\text{R/hr}$ above background at 1 meter; and 1,000 dpm/100 cm^2 removable alpha and beta and 5,000 dpm/100 cm^2 total alpha and beta.
 - The results of the final survey indicated that the facility was suitable for release without radiological restrictions.
- A verification survey was conducted by the Oak Ridge Institute of Science and Education (ORISE) in October 1996.⁵ The total alpha surface activity ranged from less than 34 dpm to 170 dpm in 100 cm^2 of soil. The total beta surface activity ranged from 230 dpm to 480 dpm in 100 cm^2 of soil. The exposure rates were as follows:
 - Limit: $5 \mu\text{R/hr}$ above background.
 - Average background: $14 \mu\text{R/hr}$
 - Observed Rates: $12 \mu\text{R/hr}$ to $15 \mu\text{R/hr}$.
 - ORISE concluded that Building 4012 met DOE guidelines for unrestricted release.
- The California Department of Health Services (DHS) performed a confirmation survey of Building 4012 on July 31, 1996.⁶
- The Environmental Protection Agency (EPA) conducted an oversight verification survey in 2001.⁷ The surveys included scans and fixed point measurements for alpha and beta. The contaminants of concern (COCs) for Building 4012 were mixed fission products, uranium and activation products on the floors and walls.
 - Acceptable limits for the survey were consistent with NRC regulatory guide 1.86 and the proposed site-wide release criteria.⁶
 - None of the field measurements indicated the presence of radionuclides above acceptable limits.
 - EPA field measurements confirmed the conclusions reached by both Rocketdyne and ORISE.

- Immediately following building demolition in 2003, 24 soil samples were taken in a MARSSIM grid pattern over the original building footprint. Gamma spectroscopy did not detect any man-made gamma emitting radionuclides. Subsequent analysis by an outside laboratory did not detect any man-made radionuclides.^{8,9}

Status:

- DOE released the facility for unrestricted use in October 1997.^{10,11}
- DHS concurred with release the release of the facility in November 1997.⁶
- Building 4012 was demolished in 2003.

References:

- 1- Rocketdyne Report, 012-AR-0001, "Decontamination and Decommissioning of Building T012," May 8, 1997.
- 2- Review of Radiation Safety Records Management System, 2003.
- 3- Rocketdyne Report, 355-ZR-0012, "Radiation Survey of Building T012, SCTI Cogeneration Project, Rev. A," June 26, 1985.
- 4- Rocketdyne Report, 012-AR-0002, "Final Radiological Survey Report for Building T012," June 14, 1996.
- 5- ORISE Report, 96-0869, "Verification Survey of Building T012, SSFL, Rockwell International, Ventura County, California," October 1996.
- 6- DHS/RHB, Letter, "Boeing's Request for Concurrence in Release for Use Without Radiological Restriction, Rocketdyne Santa Susana Field Laboratory Building T012," from Gerard Wong (DHS/RHB) to James Barnes, November 26, 1997.
- 7- U.S. EPA Report, Contract Number 68-W-02-021, "Final Oversight Verification and Confirmation Radiological Survey Report for Buildings T-012, T-029, and T-363," December 20, 2002.
- 8- Personnel Interview, Phil Rutherford, April 2004 (Area IV Database for Onsite and Offsite Surveys).
- 9- Boeing Document, RD04-170, "Site Environmental Report for Calendar Year 2003 DOE Operations at The Boeing Company, Rocketdyne Propulsion & Power," September 2004.
- 10- Federal Register Vol. 62 NO. 195 pg. 52528-52530, "Certification of the Radiological Condition of Building T012 at ETEC near Chatsworth, California," October 8, 1997.
- 11- DOE/CD-ETEC-012, "Certification Docket for the Release of Building T012 at ETEC," November 1997.
- 12- Historical Site Photographs from Boeing Database.
- 13- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4012



Site Summary – Building 4013

Site Identification:

Building 4013
Thermal Transient Test Facility
Non-Nuclear Component Assembly and Packaging Building
SNAP System Assembly and Checkout Building
Includes Building 4713, Substation
Includes Building 4823, Time Clock
Includes Building 4413, Uninterruptible Power Supply (UPS)

Operational Use/History:

- Constructed in 1962.¹
- Building 4013 was used to assemble non-nuclear SNAP 10A and SNAP 2 ground test and flight test systems and was subsequently used for thermal transient testing.²
- In addition, in Building 4013 thermal and mechanical testing was combined in order to simulate seismic events for the purpose of stress testing.²
- Building 4013 was demolished in 2003.

Site Description:

- Building 4013 is a single story multi-room, Butler-type building. The ceiling is split, with a height of 15 feet in one portion and 33 feet in the other. The steel frame is anchored to a concrete slab floor with corrugated metal siding. The roof is constructed from composition and galvanized materials. There is a 5-ton bridge crane.
- Building 4013 is attached to the site sewer system.²
- Serviced by Substation 4713.
- Serviced by Time Clock 4823.
- Service by UPS 4413

Relevant Site Information:

- No incidents occurred in Building 4013 that might have resulted in a release of contamination to the environment.³

Radiological Surveys:

- In August 1988, a radiological survey was conducted on the interior of Building 4013.⁴
 - Average ambient gamma radiation: 6.8 μ R/hr.
 - Background: between 14 μ R/hr to 16 μ R/hr.
 - Survey results were below the acceptable limits.

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Status:

- Building 4013 was demolished in 2003.

References:

- 1- DOE Document, Site Development and Facility Utilization Planning, SSFL.
- 2- Rocketdyne Internal Document, no document number, "Assessment of Department of Energy Buildings within the SSFL," September 30, 1996.
- 3- Review of Radiation Safety Records Management System, 2003.
- 4- Boeing Document, EID-04374, "Final Report, Decontamination and Dismantlement Operations at SSFL Building 4019 for Release Without Radiological Restrictions," September 11, 1999.
- 5- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 6- Historical Site Photographs from Boeing Database.

Photograph – Building 4013



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Site Summary – Building 4019

Site Identification:

Building 4019
SNAP Flight System Critical Facility
Acceptance Test Facility
ETEC Construction Staging and Computer Facility
Includes Building 4719, Substation

Operational Use/History:

- Constructed in 1962.
- Building 4019 was built to perform criticality acceptance tests of SNAP reactors before they were delivered for launch.¹
- Three reactors (FS-1, FS-4 and FS-5) were assembled and tested from 1964 to 1965.²
- In 1965, all nuclear materials were removed from Building 4019 when the last SNAP reactor was removed.¹
- Building 4019 was reassigned for non-nuclear use in the 1970s and 1980s.²
- In 1998, the small area identified in the 1996 ORISE survey was decontaminated.²
- Building 4019 is now inactive.³

Site Description:

- Building 4019 is a steel-framed building with a built-up roof on a concrete slab. The 10- foot tall low bay section is 60 x 28 feet and contains offices, conference room, restrooms and an equipment room. The 36-foot tall high bay section is 60 x 45 feet and contains a cinder block storage room and a below-grade vacuum test vault.³
- Serviced by Substation 4719.

Relevant Site Information:

- All radioactive and nuclear material handled at the facility was fully encapsulated.³
- One incident was reported that could have resulted in a release to the environment.
 - On April 10, 1976, a quality assurance inspection personnel was unable to return a source material to the safe directly after use. It was later discovered that the source had detached from its travel cable and the source was reattached and returned to the safe. Release of contamination to the environment as a result of this incident was unlikely (A0304).

Radiological Surveys:

- In 1988, Rocketdyne performed a radiological survey to determine if any radioactive material had been accidentally left behind to such an extent that further radiological inspection and/or decontamination was warranted.

Group L

- The survey covered Building 4019 along with one other building and two adjacent areas through ambient gamma exposure rate surveys.⁴
 - Ambient gamma exposure rates corrected for background measured in Building 4019 varied from 0.04 $\mu\text{R/hr} \pm 1.09 \mu\text{R/hr}$ (limit is 5.0 $\mu\text{R/hr}$ above background).
 - The survey concluded that none of the areas were contaminated with residual radioactivity and that all areas meet the unrestricted use criteria for release.
 - One anomalous measurement was recorded in the high bay but 21 subsequent measurements and a survey for beta activity in the area proved that it was an anomaly.
- ORISE performed a verification survey in 1996 to validate the cleanup procedures and survey methods used by Rockwell/Rocketdyne. The survey conducted surface scans, surface activity level measurements and exposure rate measurements.⁵
 - The survey concluded that the unrestricted use release criteria were exceeded in a small area of Building 4019, the documentation of previous surveys was not adequate, and the vault of Building 4019 was not accessible for survey.
 - The document review found that the documentation did not provide a clear description of the sequence of events necessary for demonstrating that the subject areas meet the requirements for release to unrestricted use.
 - Surface scans found one area of elevated beta radiation in the high bay portion of Building 4019. No other areas had elevated levels of alpha, beta or gamma radiation.
 - Total surface alpha: $<55 \text{ dpm}/100\text{cm}^2$ (limit is $5,000 \text{ dpm}/100\text{cm}^2$).
 - Total surface beta: $<1,400 - 11,000 \text{ dpm}/100\text{cm}^2$ (limit is $5,000 \text{ dpm}/100\text{cm}^2$).
 - Removable alpha: $<12 \text{ dpm}/100\text{cm}^2$ (limit is $1,000 \text{ dpm}/100\text{cm}^2$).
 - Removable beta: $<16 \text{ dpm}/100\text{cm}^2$ (limit is $1,000 \text{ dpm}/100\text{cm}^2$).
 - Ambient gamma: between 10 and 11 $\mu\text{R/hr}$ compared to a background rate of 8 $\mu\text{R/hr}$ (limit is 5.0 $\mu\text{R/hr}$ above background).
- In 1998, Boeing performed a final status survey. The survey covered the entire facility through direct radiation measurements, removable contamination swipes and an ambient gamma exposure survey.³
 - Maximum direct alpha radiation: $11 \text{ dpm}/100\text{cm}^2$ (limit is $5,000 \text{ dpm}/100\text{cm}^2$). Maximum direct beta radiation: $961 \text{ dpm}/100\text{cm}^2$ (limit is $5,000 \text{ dpm}/100\text{cm}^2$).
 - Maximum removable alpha: $5 \text{ dpm}/100\text{cm}^2$ (limit is $1,000 \text{ dpm}/100\text{cm}^2$).
 - Maximum removable beta: $25 \text{ dpm}/100\text{cm}^2$ (limit is $1,000 \text{ dpm}/100\text{cm}^2$).
 - Maximum ambient gamma: 15.7 $\mu\text{R/hr}$.
 - Background: 13.3 $\mu\text{R/hr}$.
 - Acceptable limit: 5.0 $\mu\text{R/hr}$ above background.
 - The survey concluded that Building 4019 met the unrestricted use criteria approved by DOE and DHS.

- In 1998, ORISE performed a supplementary verification survey to evaluate the shortcomings found in 1996. The survey covered Buildings 4019 and 4024 through surface scans, surface activity level measurements, and exposure rate measurements.⁶
 - Total surface activity levels ranged from 14 to 43 dpm/100cm² alpha (limit is 5,000 dpm/100cm²) and -190 to 550 dpm/100cm² beta (limit is 5,000 dpm/100cm²).
 - Removable activity levels were all less than the minimum detection concentration levels of 9 dpm/100cm² alpha and 12 beta dpm/100cm².
 - The ambient gamma exposure rate measured within the vault was 12 µR/hr compared to a background level of 8 µR/hr (limit is 5.0 µR/hr above background).
 - The survey concluded that the facilities met the criteria for release to unrestricted use.
- DHS performed verification sampling in 1998.
- In 2001, EPA conducted an oversight verification survey for alpha, beta, beta-gamma radiation (total and removable) and gamma radiation.⁷ Surveys were performed to a quality level equal to a final status survey as defined by the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). The contaminants of concern were: mixed fission products, uranium, transuranic compounds, and activation and corrosion products. EPA also collected concrete core samples, which were analyzed for photon-emitting isotopes.
 - Acceptable limits for the survey were consistent with NRC regulatory guide 1.86 and the proposed site-wide release criteria as defined in the 1996 Area IV survey.⁸
 - None of the field measurements indicated the presence of radionuclides above acceptable limits.
 - EPA field measurements confirmed the conclusions reached by both Rocketdyne and ORISE.

Status:

- In February, 2005 DOE provided a letter to Boeing declaring that Boeing and ORISE surveys had confirmed that DOE and DHS approved cleanup limits had been met, and that Building 4019 was suitable for release for unrestricted use.⁹
- Building 4019 is now inactive.³

References:

- 1- Phil Rutherford Website, <http://rdweb/shearadiationsafety/>, accessed August 2003.
- 2- Boeing Document, EID-04374 "Final Report, Decontamination and Dismantlement Operations at SSFL Building 4019 for Release Without Radiological Restrictions," September 11, 1999.
- 3- Boeing Report, RS-00009, "Building 4019, Final Status Survey Report," June 10, 1999.

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- 4- Rocketdyne Report, GEN-ZR-0010, "Radiological Survey of Buildings T019 and T013; an Area Northwest of T059, T019, T013, and T012; and a Storage Yard West of Buildings T626 and T038," August 26, 1988.
- 5- ORISE Report, 96/C-5, "Verification Survey of Buildings T019 and T024, Santa Susana Field Laboratory, Rockwell International, Ventura County, California," February 1996.
- 6- ORISE Letter, "Addendum to the Verification Survey Report for Buildings T019 and T024, Santa Susana Field Laboratory, Ventura County, California," February 16, 1999.
- 7- U.S. EPA, Contract Number 68-W-02-021, "Final Oversight Verification and Confirmation Radiological Survey Report for Buildings T-011, T-019, T-055, and T-100," December 20, 2002.
- 8- Rocketdyne Document, A4CM-ZR-0011, Rev. A, Area IV Radiological Characterization Survey, August 15, 1996.
- 9- DOE Letter, "Release of Building 4019," from M. Lopez (DOE) to M. Lee (Boeing), February 1, 2005.
- 10- Historical Site Photographs from Boeing Database.
- 11- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.

Photograph – Building 4019



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Site Summary – Building 4228

Site Identification:

Building 4228
Power Pak Facility
SCTI Co-Generation Plant
Includes Building 4708, Substation for Inbound Power
Includes Site 4807, Electrical Equipment Pads
Includes Site 4808, Electrical Equipment Pads
Includes Site 4809, Air Blast Heat Exchanger Pad
Includes Building 4710, SCTI Power Pak Cooling Tower

Operational Use/History:

- Constructed in the early 1980s.¹
- The SCTI Power Pak facility was designed to harness the steam produced through SCTI's sodium experiments and generate commercial electric power. The system operated from 1988 through 1993. The power generated was sold onto the grid through Edison Power.²
- Demolished in 2003.

Site Description:

- Building 4228 was located east of Building 4013. The northwest end of Building 4228 was built on top of Building 4012.
- Serviced by Substation 4708.
- Serviced by Electrical Equipment Pad 4807.
- Serviced by Electrical Equipment Pad 4808.
- Serviced by Air Blast Heat Exchanger Pad 4809.
- Serviced by Cooling Tower 4710.

Relevant Site Information:

- There are no Use Authorizations and no Incident Reports associated with Building 4228.³

Radiological Surveys:

- When Building 4228 was demolished, Building 4012 had been released by DOE. The SHEA Impact Review Checklist found the demolition of Building 4228 neither involved radioactive materials nor was conducted in a radiological area. This conclusion was confirmed by the release and demolition of Building 4012.
- Further radiological surveys specific to Building 4228 have not been conducted.

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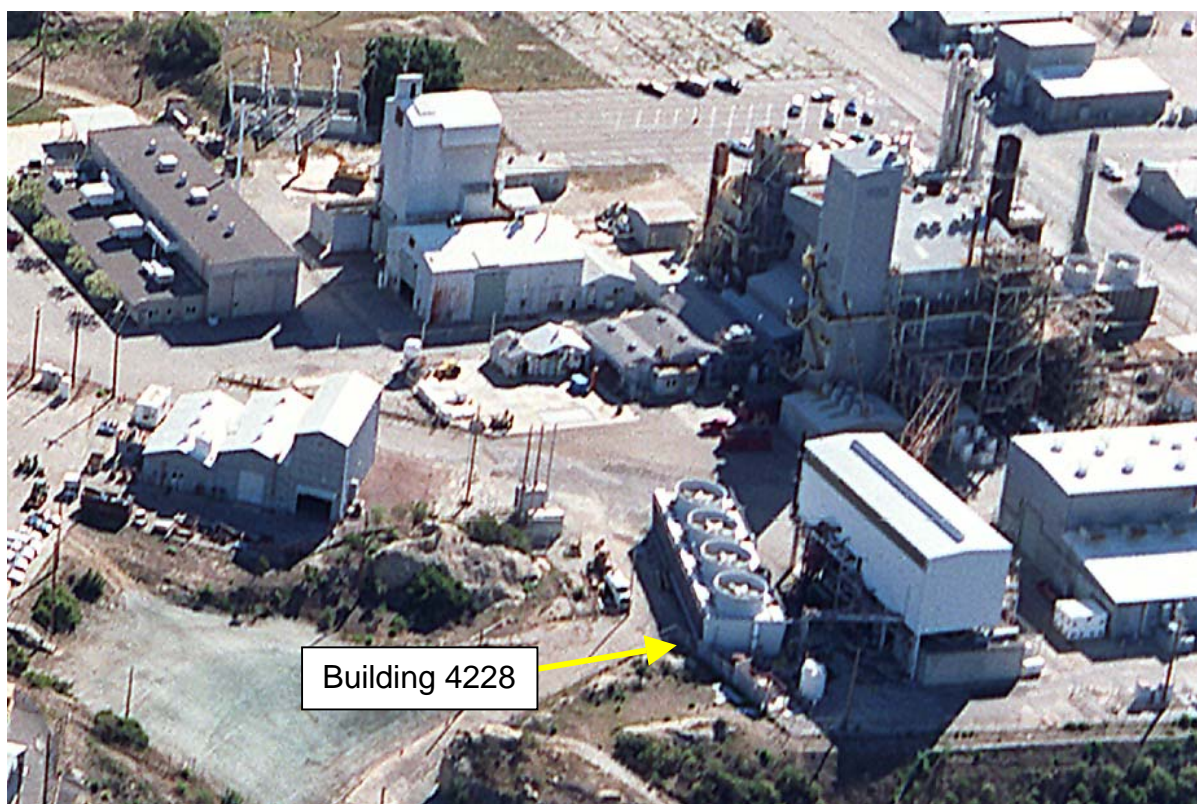
Status:

- Building 4228 was demolished in 2003.⁴

References:

- 1- SSFL Area IV, ETEC Industrial Planning Maps, 1962-1992.
- 2- Personnel Interview, Sandy Samuels, September 16, 2003.
- 3- Review of Radiation Safety Records Management System, 2003.
- 4- Boeing Internal Document, no document number, "Demolition Binder: Power Pak Buildings 4428 & 4710."
- 5- Historical Site Photographs from Boeing Database.

Photograph – Building 4228



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